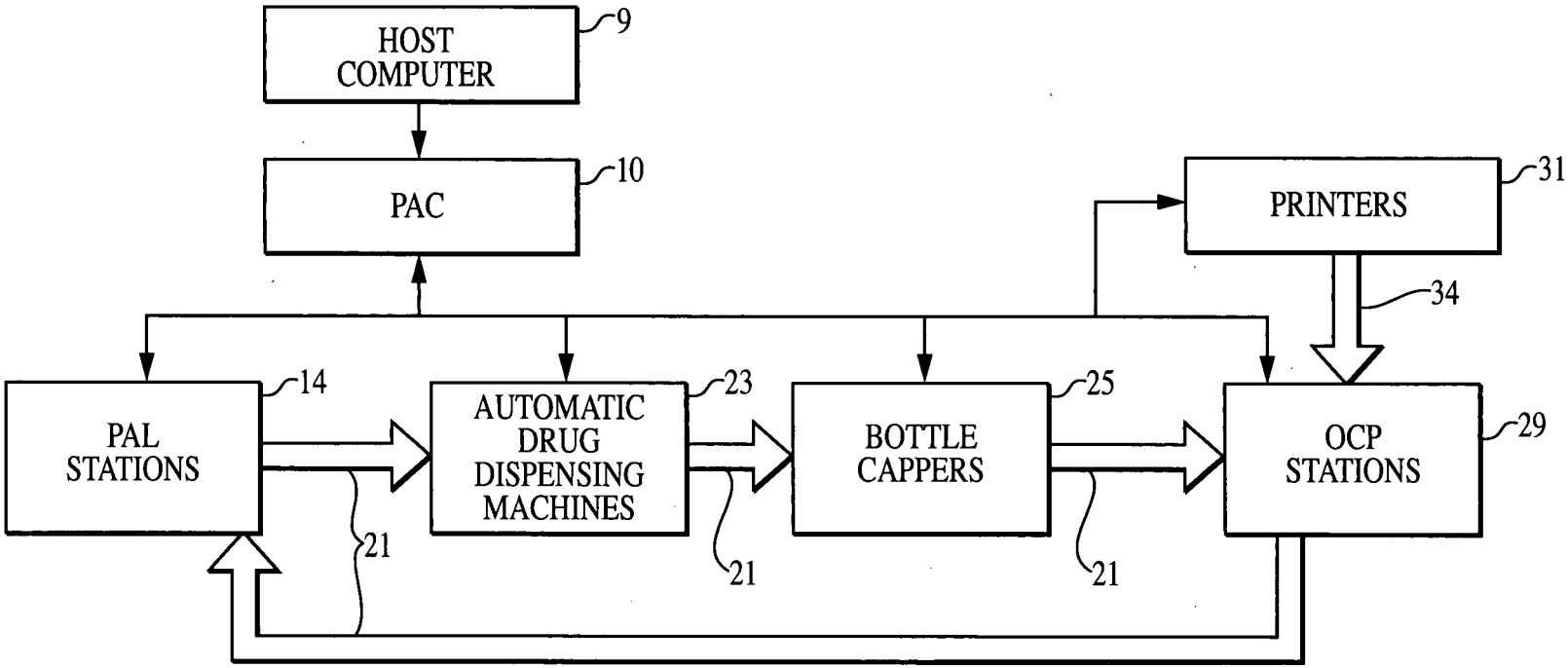

HOST COMPUTER
9
PAC
10
PRINTERS
31
34
PAL STATIONS
14
AUTOMATIC DRUG DISPENSING MACHINES
23
BOTTLE CAPPERS
25
OCP STATIONS
29
21
21
21

FIG. 1A

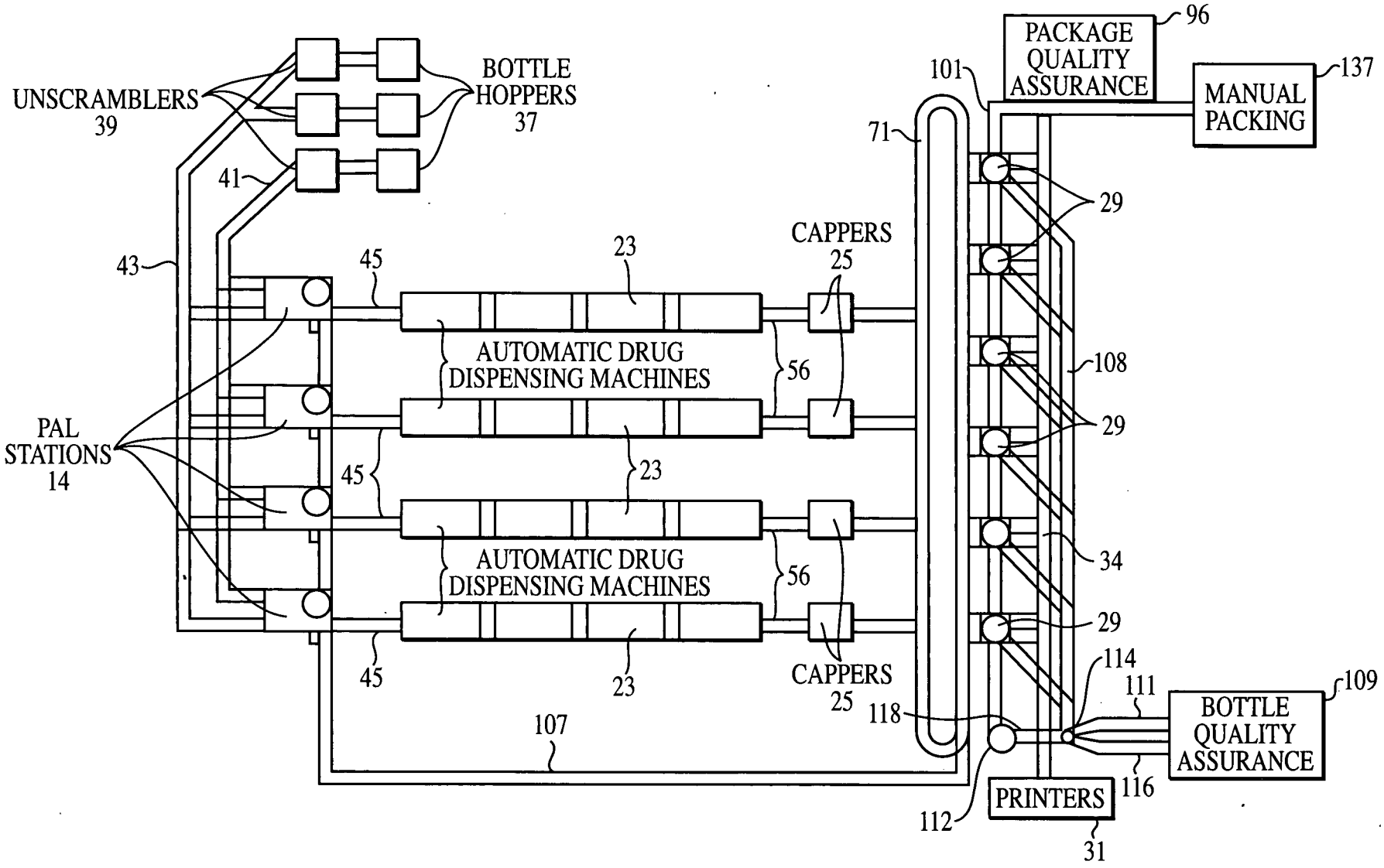

UNSCRAMBLERS
39
BOTTLE
HOPPERS
37
41
43
45
23
CAPPERS
25
AUTOMATIC DRUG
DISPENSING MACHINES
56
PAL
STATIONS
14
45
23
AUTOMATIC DRUG
DISPENSING MACHINES
56
45
23
CAPPERS
25
107
71
101
PACKAGE
QUALITY
ASSURANCE
96
MANUAL
PACKING
137
29
108
29
34
29
114
111
BOTTLE
QUALITY
ASSURANCE
109
118
116
112
PRINTERS
31

FIG. 1B

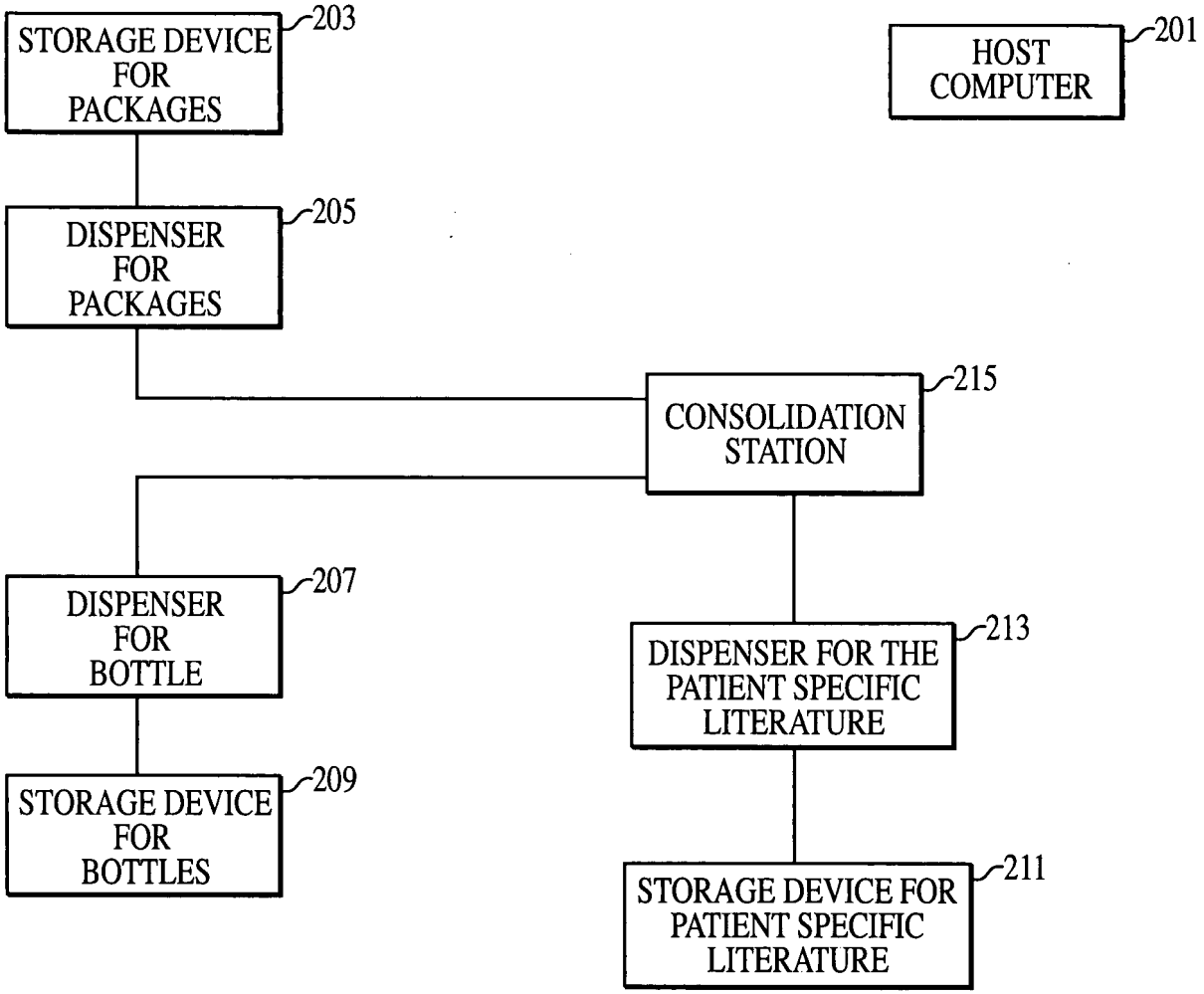

STORAGE DEVICE FOR PACKAGES
203
HOST COMPUTER
201
DISPENSER FOR PACKAGES
205
CONSOLIDATION STATION
215
DISPENSER FOR BOTTLE
207
DISPENSER FOR THE PATIENT SPECIFIC LITERATURE
213
STORAGE DEVICE FOR BOTTLES
209
STORAGE DEVICE FOR PATIENT SPECIFIC LITERATURE
211

FIG. 2

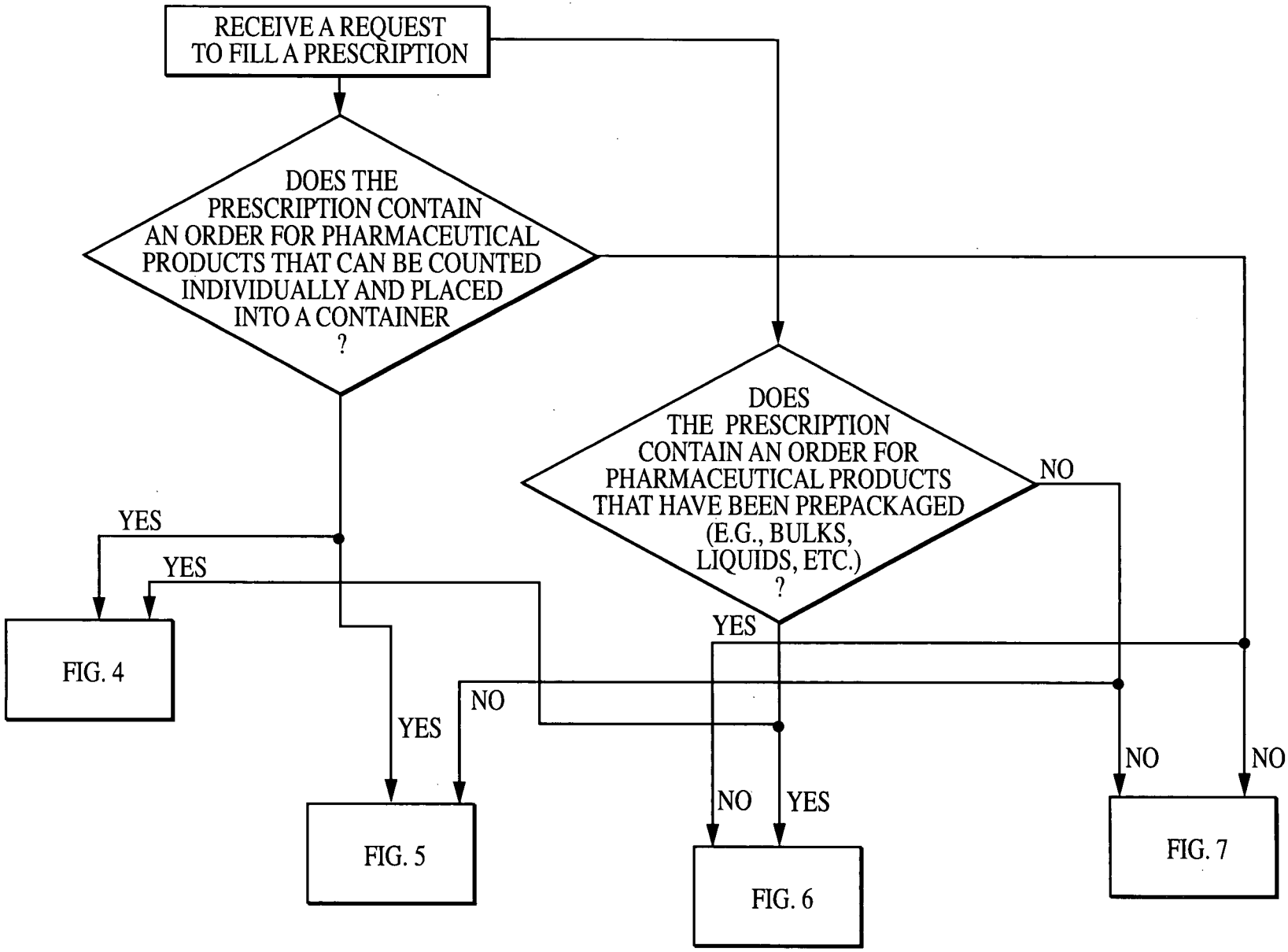

RECEIVE A REQUEST TO FILL A PRESCRIPTION
DOES THE PRESCRIPTION CONTAIN AN ORDER FOR PHARMACEUTICAL PRODUCTS THAT CAN BE COUNTED INDIVIDUALLY AND PLACED INTO A CONTAINER ?
DOES THE PRESCRIPTION CONTAIN AN ORDER FOR PHARMACEUTICAL PRODUCTS THAT HAVE BEEN PREPACKAGED (E.G., BULKS, LIQUIDS, ETC.) ?
YES
YES
NO
YES
NO
YES
NO
NO
NO
YES
FIG. 4
FIG. 5
FIG. 6
FIG. 7

FIG. 3

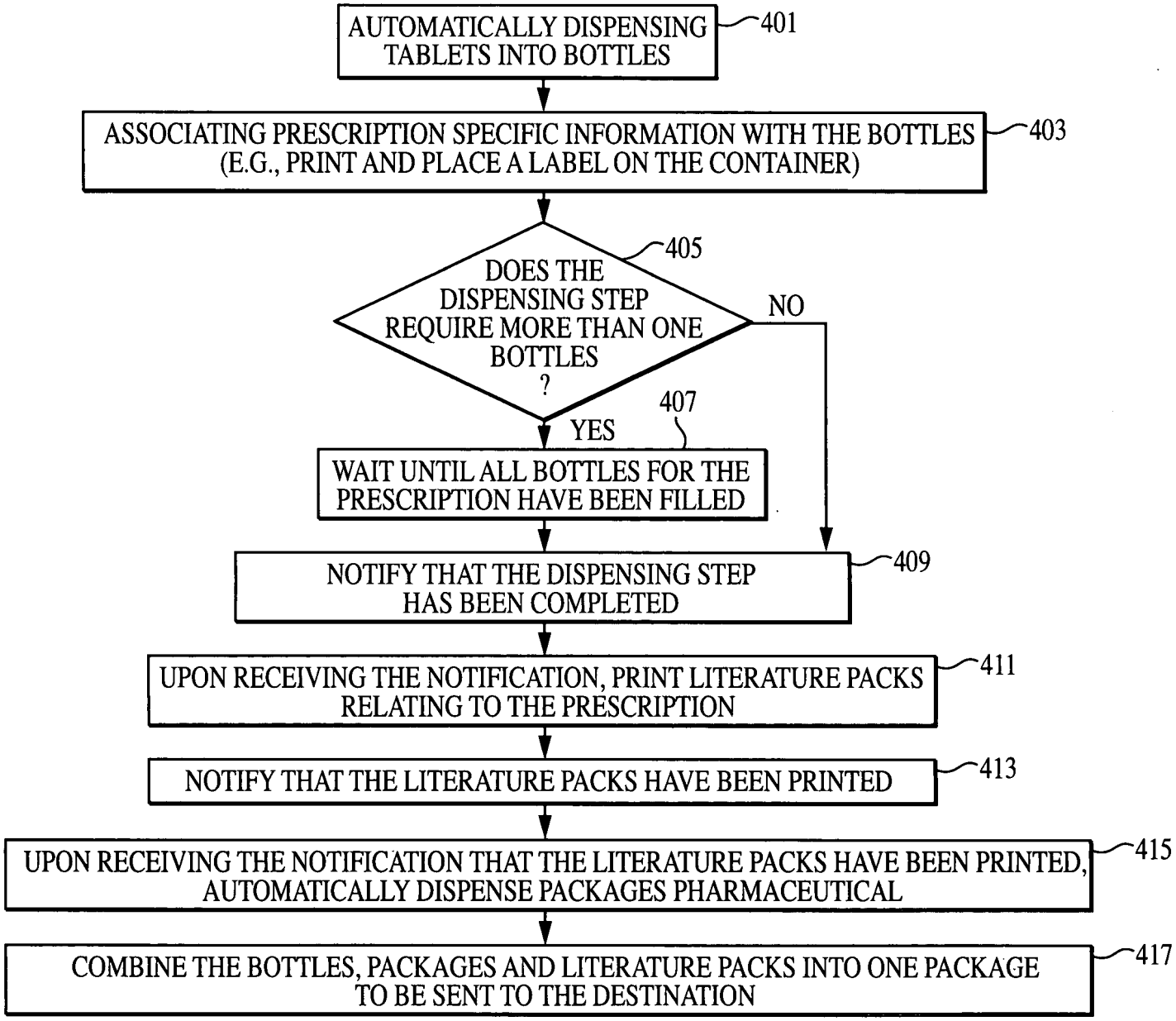

AUTOMATICALLY DISPENSING TABLETS INTO BOTTLES
401
ASSOCIATING PRESCRIPTION SPECIFIC INFORMATION WITH THE BOTTLES (E.G., PRINT AND PLACE A LABEL ON THE CONTAINER)
403
DOES THE DISPENSING STEP REQUIRE MORE THAN ONE BOTTLES ?
405
NO
YES
407
WAIT UNTIL ALL BOTTLES FOR THE PRESCRIPTION HAVE BEEN FILLED
NOTIFY THAT THE DISPENSING STEP HAS BEEN COMPLETED
409
UPON RECEIVING THE NOTIFICATION, PRINT LITERATURE PACKS RELATING TO THE PRESCRIPTION
411
NOTIFY THAT THE LITERATURE PACKS HAVE BEEN PRINTED
413
UPON RECEIVING THE NOTIFICATION THAT THE LITERATURE PACKS HAVE BEEN PRINTED, AUTOMATICALLY DISPENSE PACKAGES PHARMACEUTICAL
415
COMBINE THE BOTTLES, PACKAGES AND LITERATURE PACKS INTO ONE PACKAGE TO BE SENT TO THE DESTINATION
417

FIG. 4

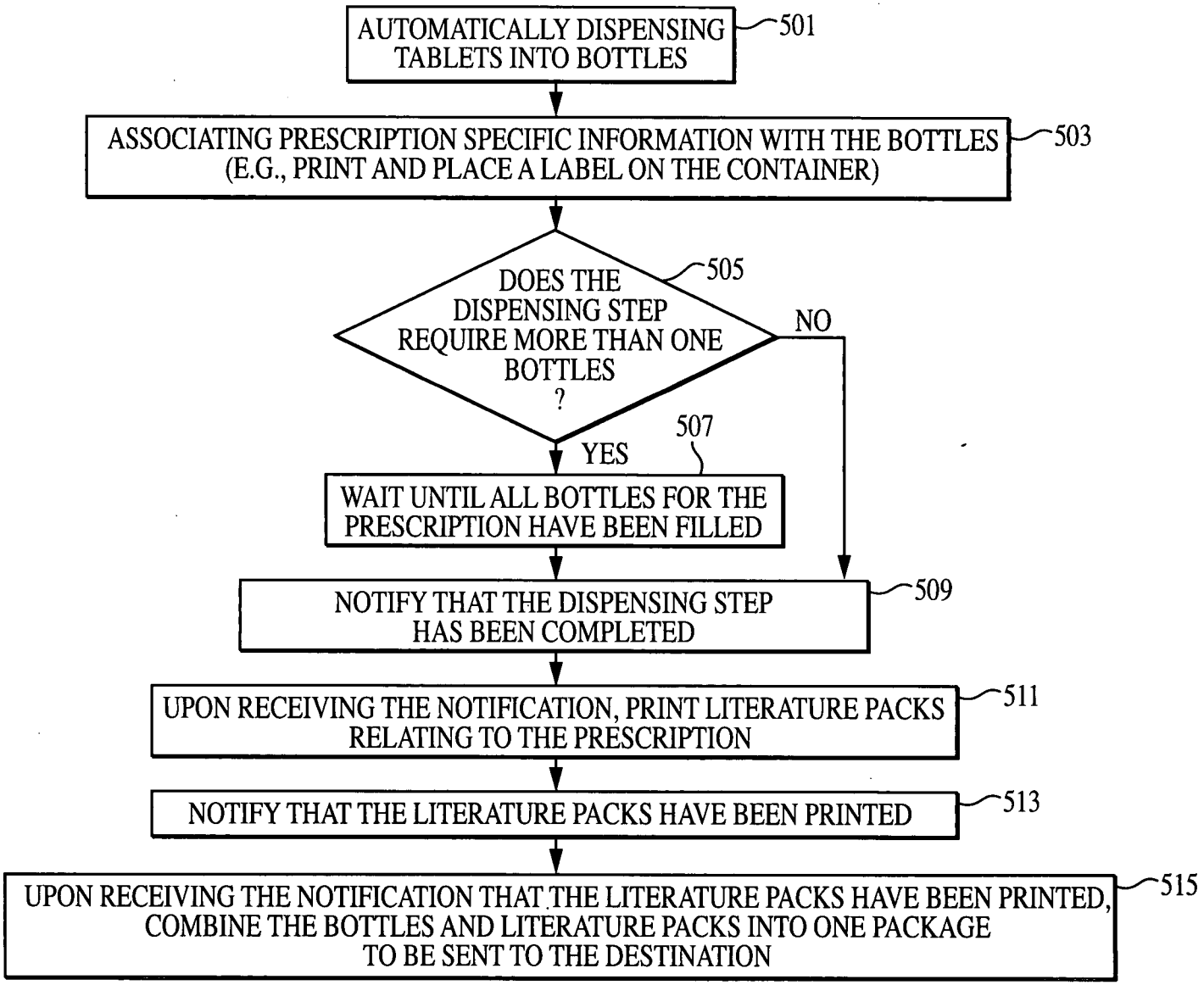

AUTOMATICALLY DISPENSING TABLETS INTO BOTTLES
501
ASSOCIATING PRESCRIPTION SPECIFIC INFORMATION WITH THE BOTTLES (E.G., PRINT AND PLACE A LABEL ON THE CONTAINER)
503
DOES THE DISPENSING STEP REQUIRE MORE THAN ONE BOTTLES ?
505
NO
YES
507
WAIT UNTIL ALL BOTTLES FOR THE PRESCRIPTION HAVE BEEN FILLED
NOTIFY THAT THE DISPENSING STEP HAS BEEN COMPLETED
509
UPON RECEIVING THE NOTIFICATION, PRINT LITERATURE PACKS RELATING TO THE PRESCRIPTION
511
NOTIFY THAT THE LITERATURE PACKS HAVE BEEN PRINTED
513
UPON RECEIVING THE NOTIFICATION THAT THE LITERATURE PACKS HAVE BEEN PRINTED, COMBINE THE BOTTLES AND LITERATURE PACKS INTO ONE PACKAGE TO BE SENT TO THE DESTINATION
515

FIG. 5

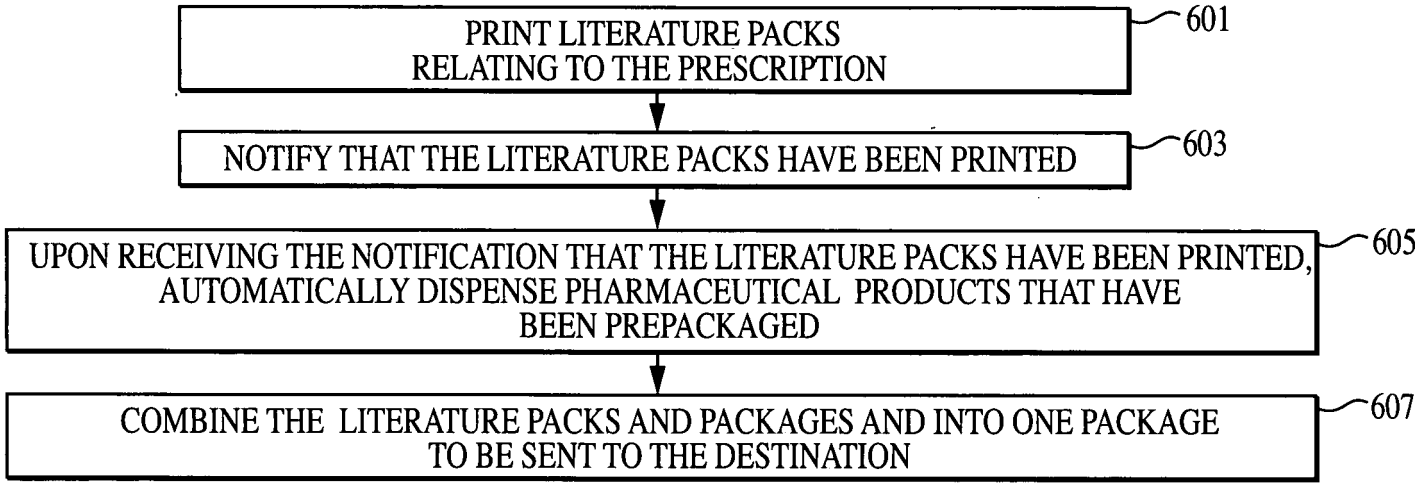

PRINT LITERATURE PACKS RELATING TO THE PRESCRIPTION
601
NOTIFY THAT THE LITERATURE PACKS HAVE BEEN PRINTED
603
UPON RECEIVING THE NOTIFICATION THAT THE LITERATURE PACKS HAVE BEEN PRINTED, AUTOMATICALLY DISPENSE PHARMACEUTICAL PRODUCTS THAT HAVE BEEN PREPACKAGED
605
COMBINE THE LITERATURE PACKS AND PACKAGES AND INTO ONE PACKAGE TO BE SENT TO THE DESTINATION
607

FIG. 6

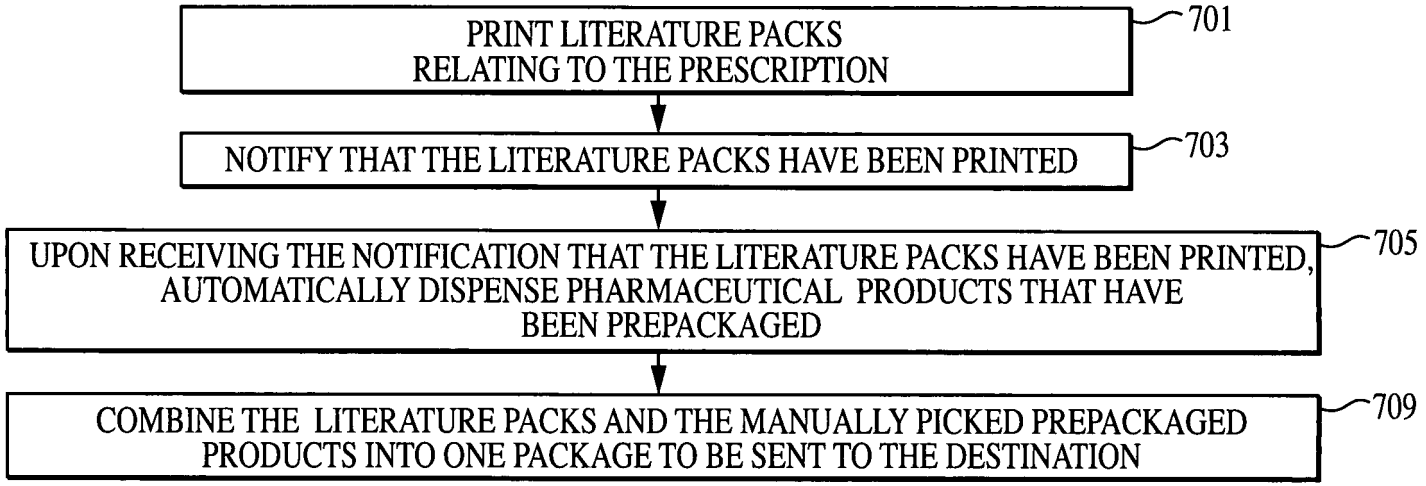
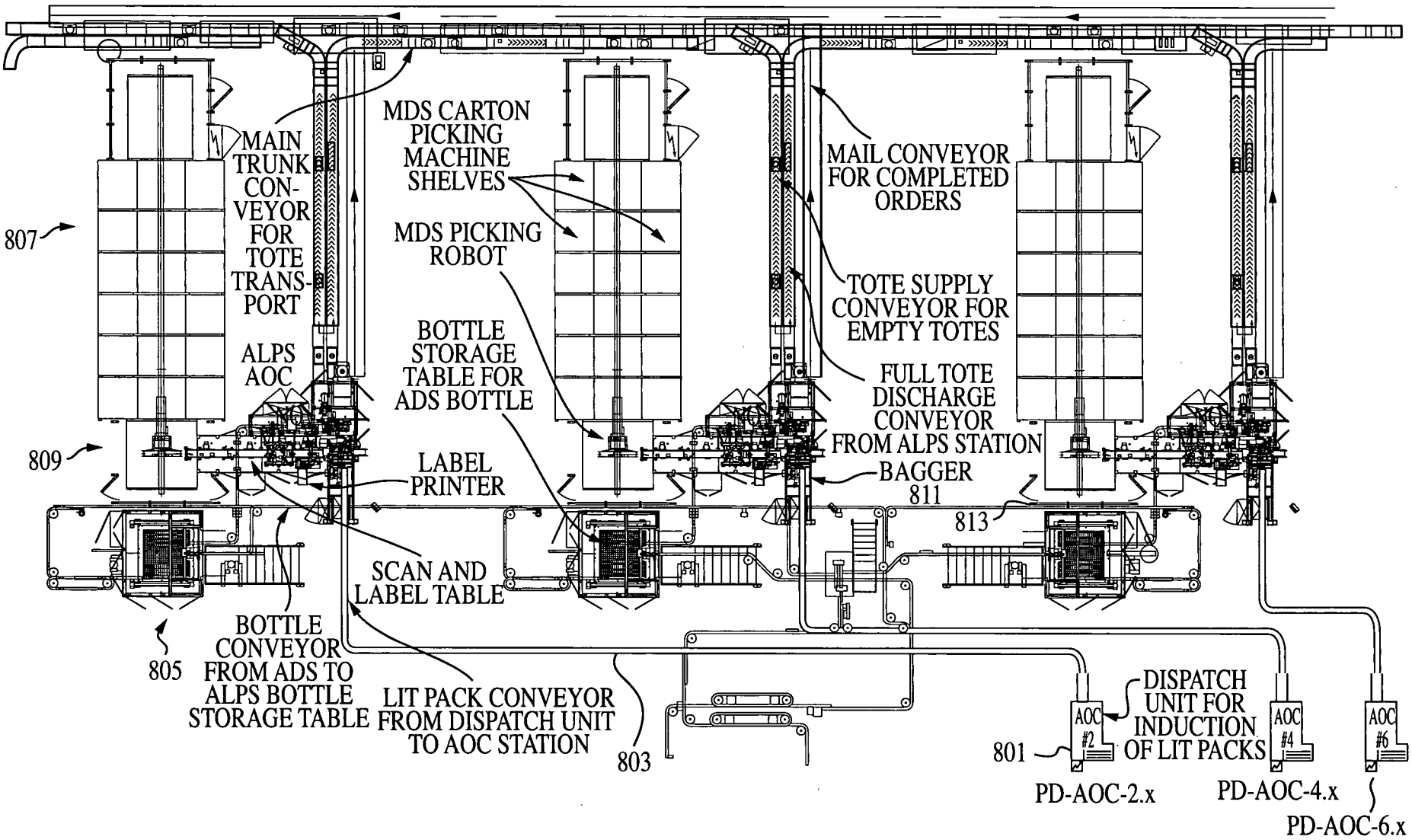

PRINT LITERATURE PACKS RELATING TO THE PRESCRIPTION
701
NOTIFY THAT THE LITERATURE PACKS HAVE BEEN PRINTED
703
UPON RECEIVING THE NOTIFICATION THAT THE LITERATURE PACKS HAVE BEEN PRINTED, AUTOMATICALLY DISPENSE PHARMACEUTICAL PRODUCTS THAT HAVE BEEN PREPACKAGED
705
COMBINE THE LITERATURE PACKS AND THE MANUALLY PICKED PREPACKAGED PRODUCTS INTO ONE PACKAGE TO BE SENT TO THE DESTINATION
709

FIG. 7



ALPS OVERALL LAYOUT (3 ALPS SUBSYSTEMS)

FIG. 8

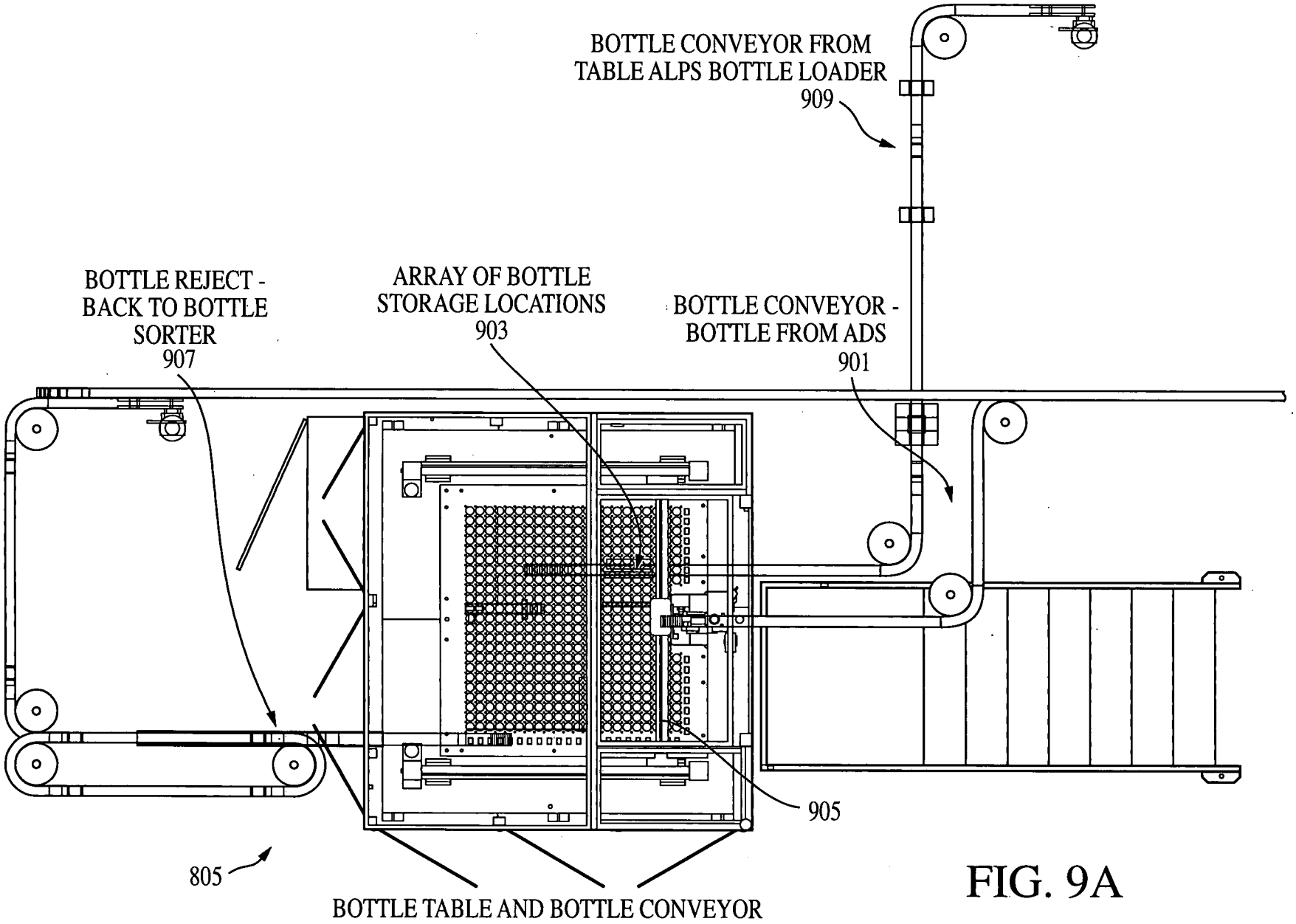

BOTTLE CONVEYOR FROM
TABLE ALPS BOTTLE LOADER
909
BOTTLE REJECT -
BACK TO BOTTLE
SORTER
907
ARRAY OF BOTTLE
STORAGE LOCATIONS
903
BOTTLE CONVEYOR -
BOTTLE FROM ADS
901
905
805
BOTTLE TABLE AND BOTTLE CONVEYOR

FIG. 9A

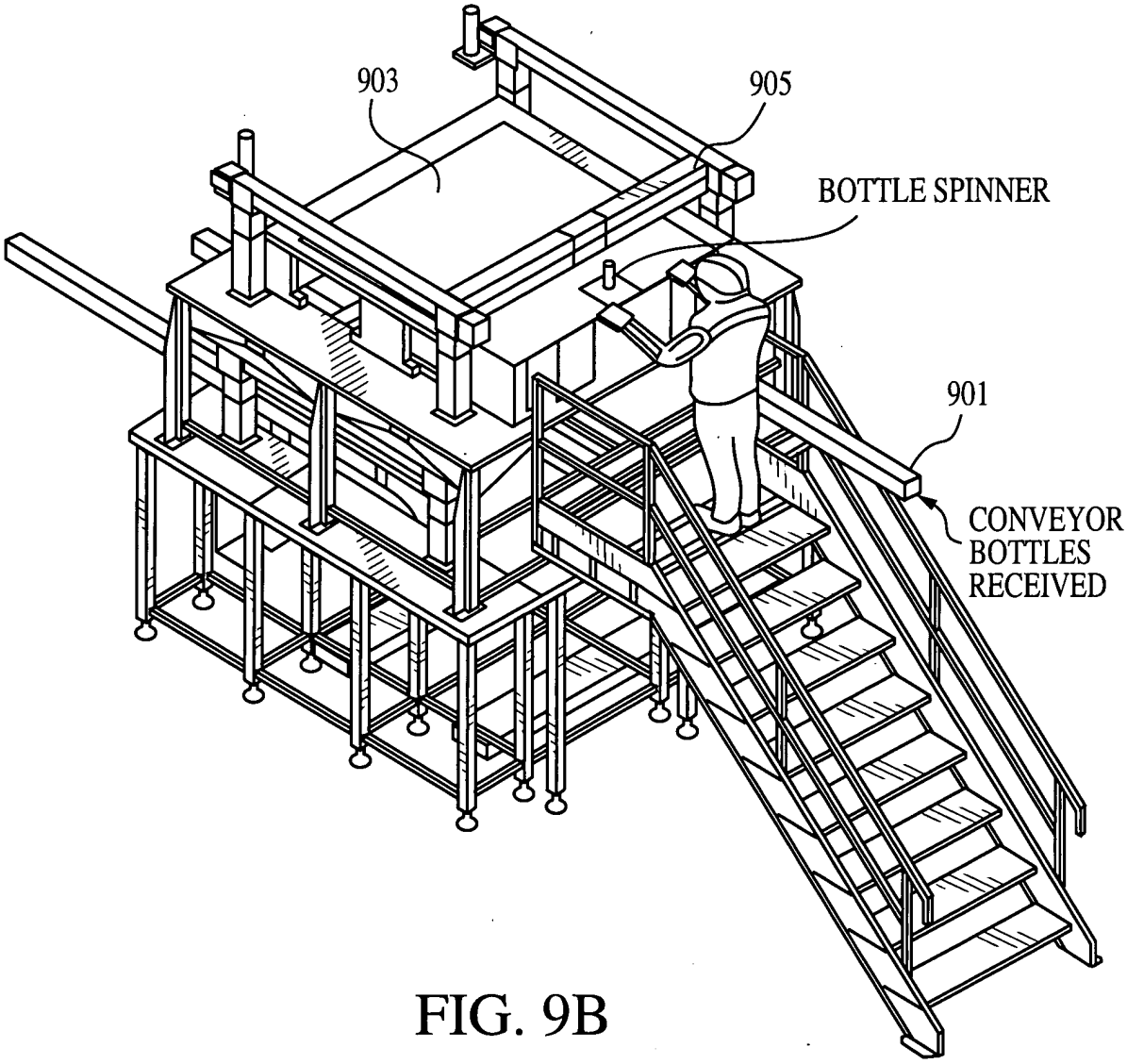


FIG. 9B

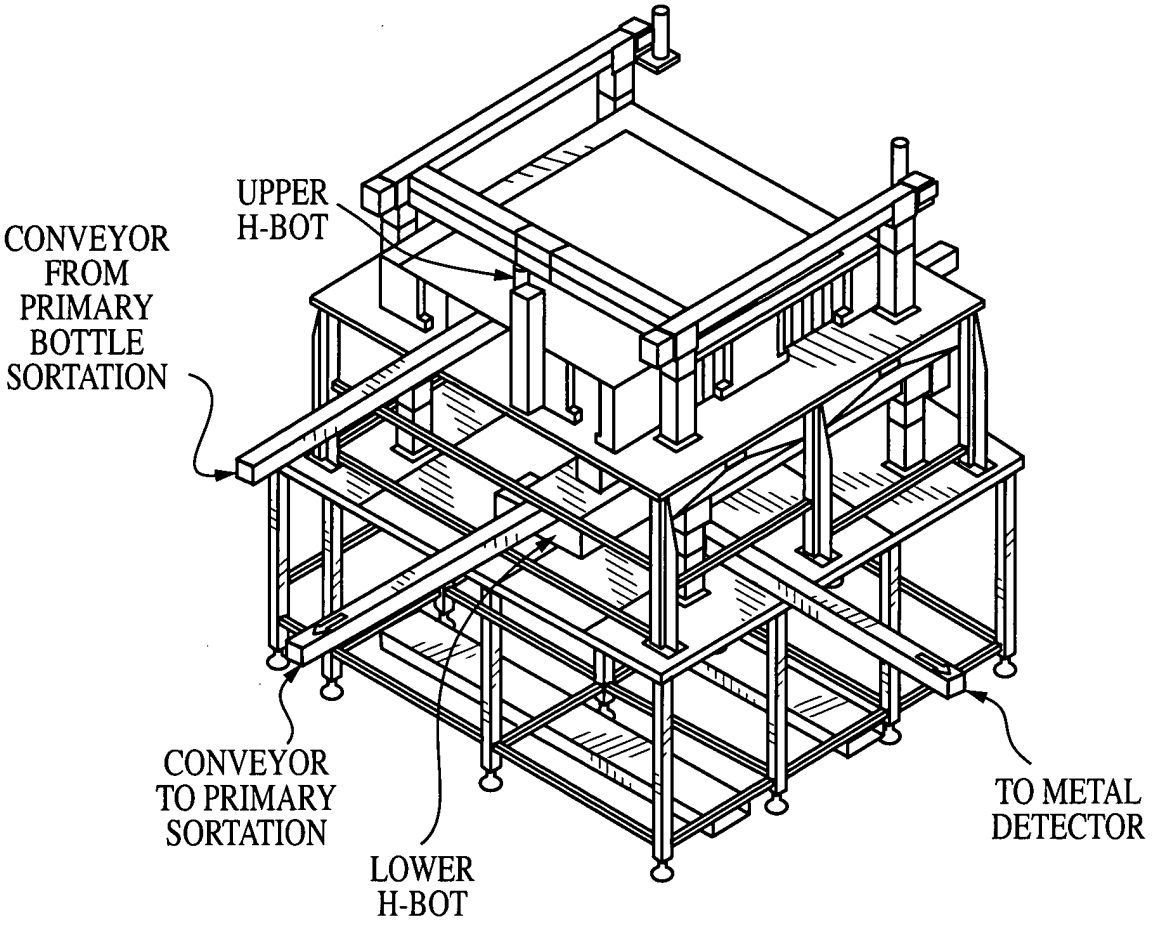

UPPER
H-BOT
CONVEYOR
FROM
PRIMARY
BOTTLE
SORTATION
CONVEYOR
TO PRIMARY
SORTATION
LOWER
H-BOT
TO METAL
DETECTOR

FIG. 9C

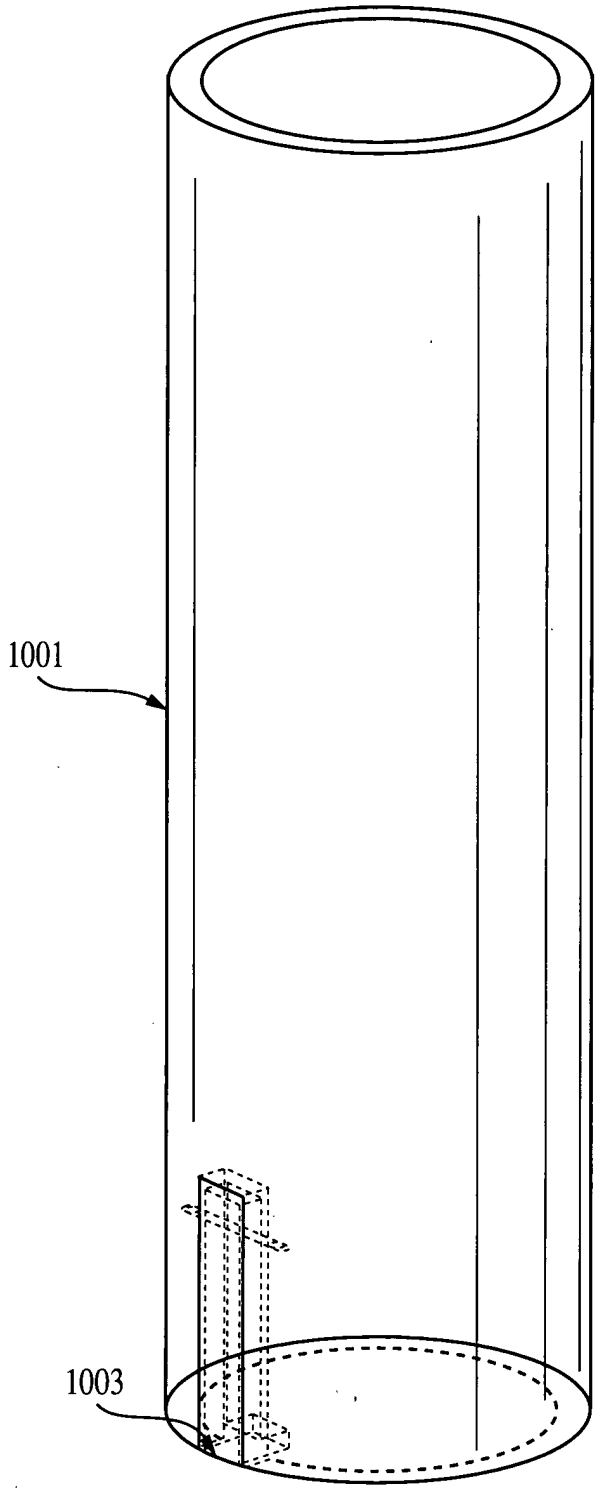
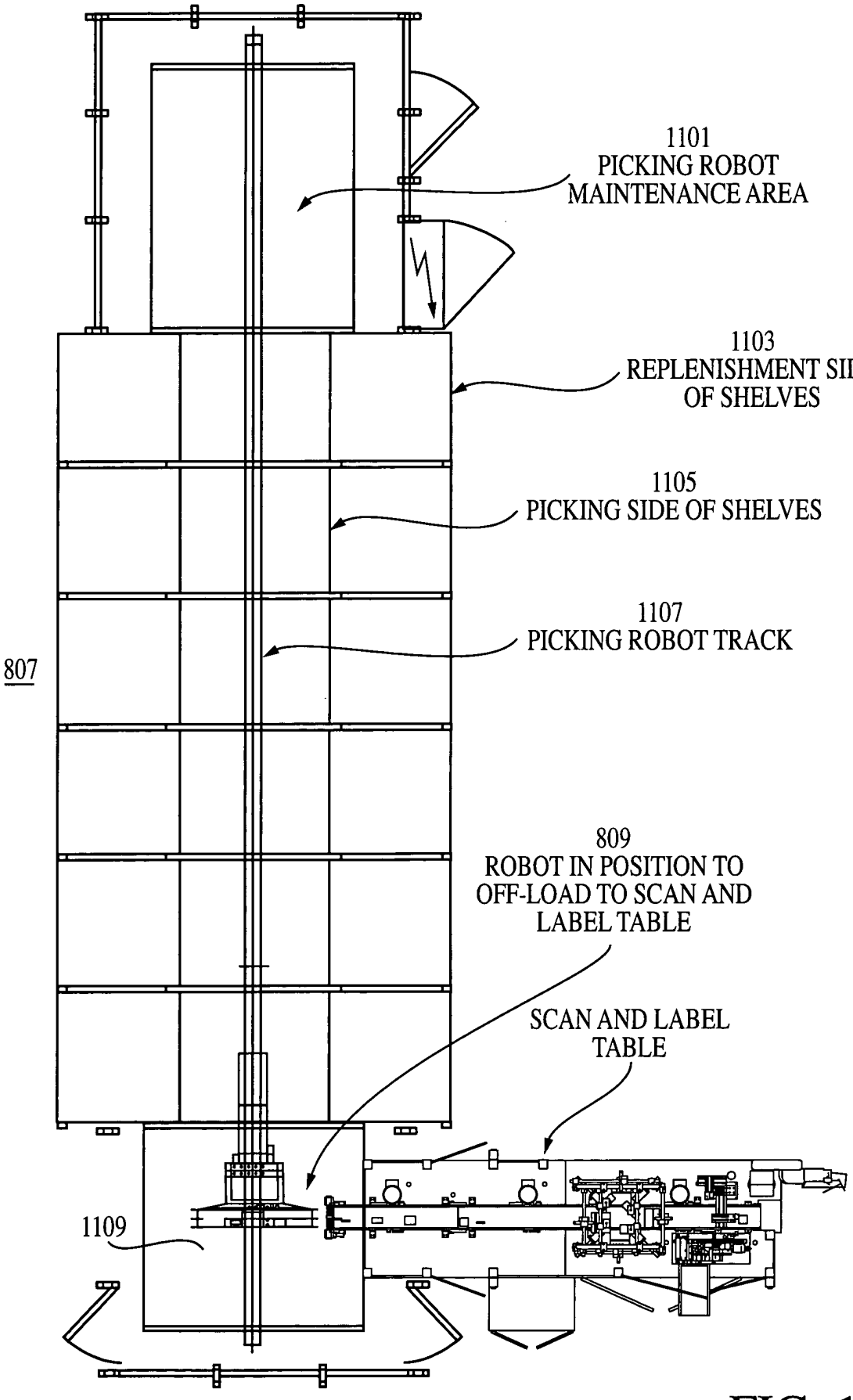


FIG. 10



SINGLUATE/SCAN TUNNEL/LABEL STATION

FIG. 11

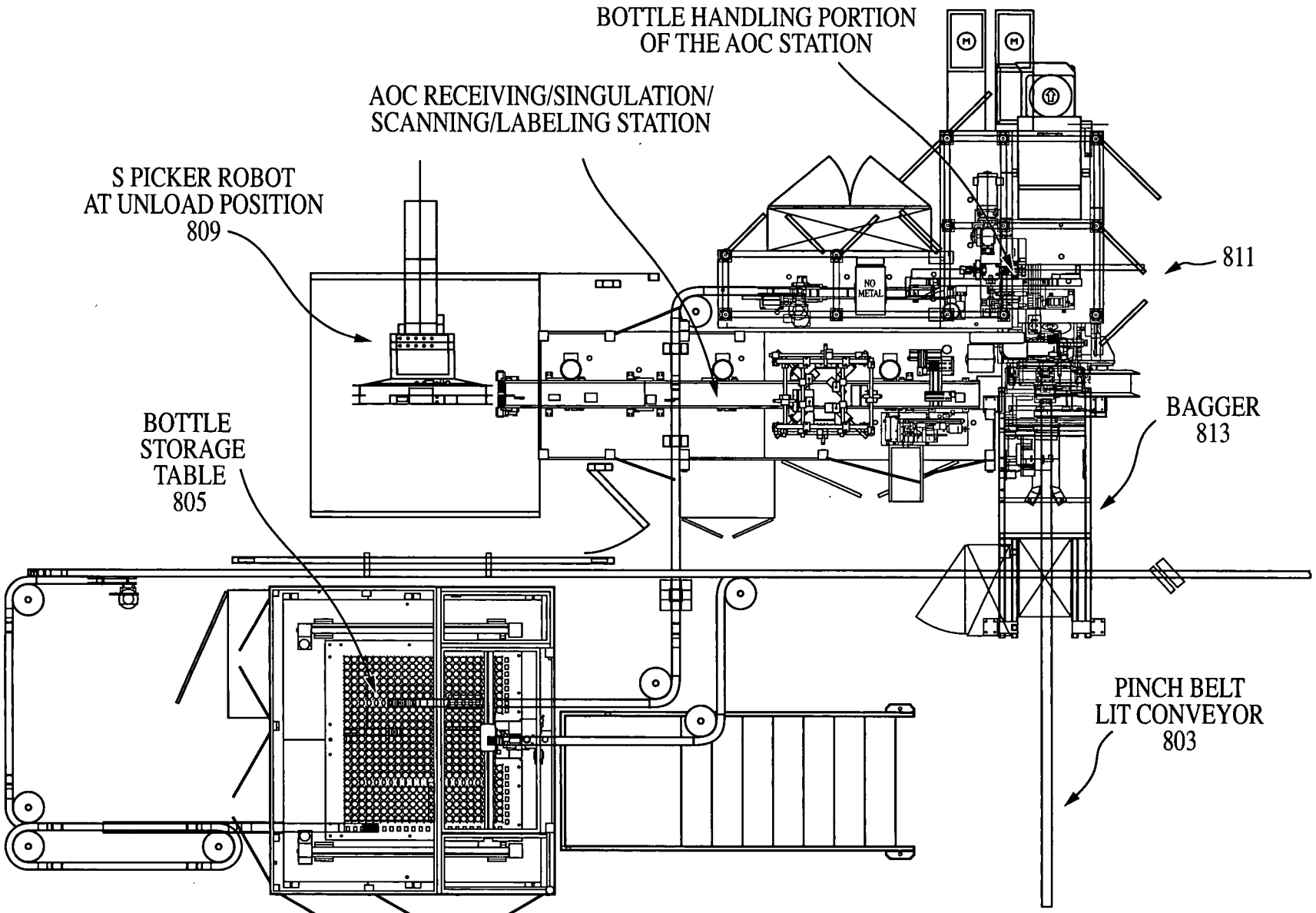

BOTTLE HANDLING PORTION
OF THE AOC STATION
AOC RECEIVING/SINGULATION/
SCANNING/LABELING STATION
S PICKER ROBOT
AT UNLOAD POSITION
809
811
BOTTLE
STORAGE
TABLE
805
BAGGER
813
PINCH BELT
LIT CONVEYOR
803
CLOSE-UP OF AOC STATION (BOTTLE TABLE, MDS, AOC, BAGGER)

FIG. 12

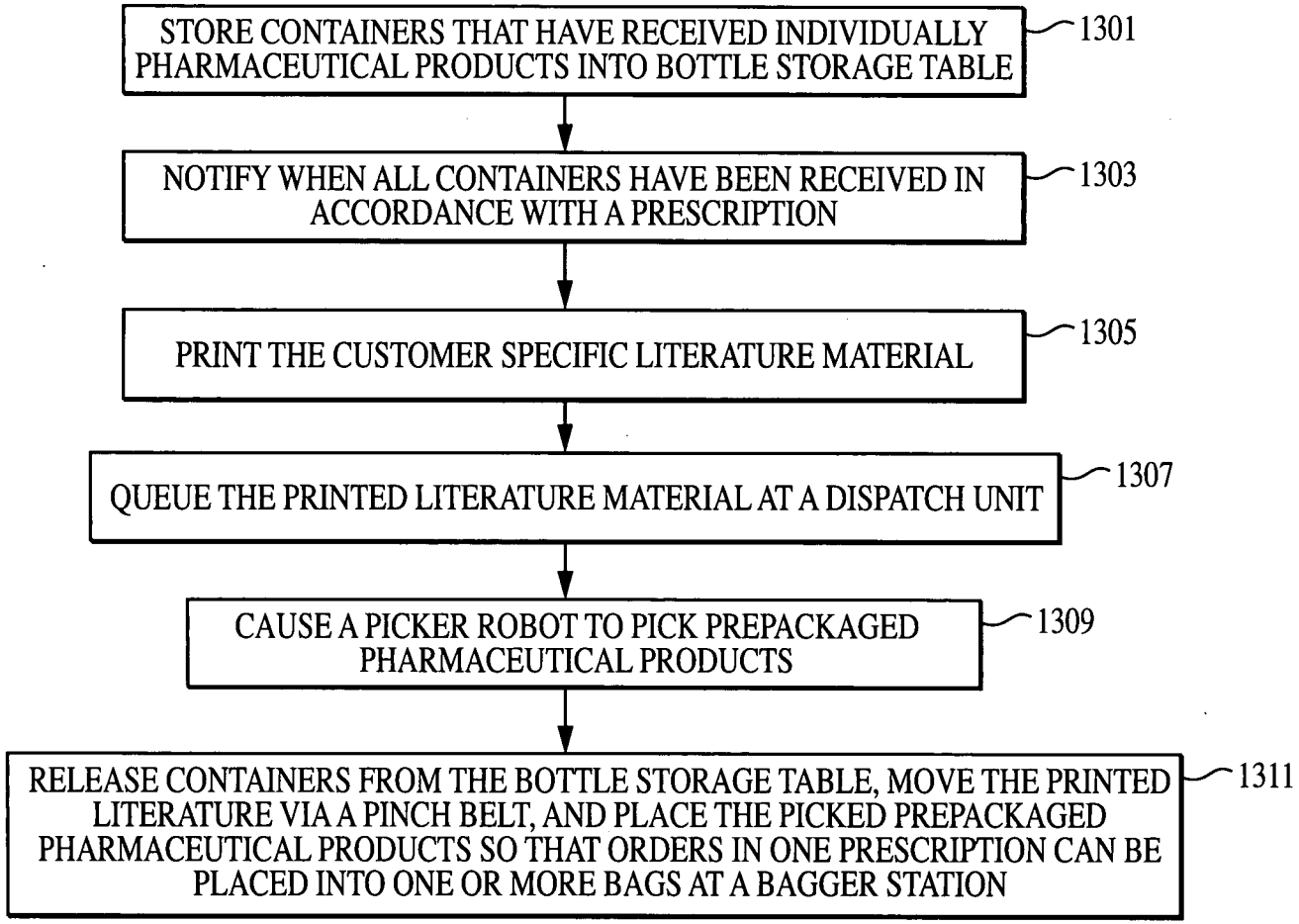

STORE CONTAINERS THAT HAVE RECEIVED INDIVIDUALLY PHARMACEUTICAL PRODUCTS INTO BOTTLE STORAGE TABLE
1301
NOTIFY WHEN ALL CONTAINERS HAVE BEEN RECEIVED IN ACCORDANCE WITH A PRESCRIPTION
1303
PRINT THE CUSTOMER SPECIFIC LITERATURE MATERIAL
1305
QUEUE THE PRINTED LITERATURE MATERIAL AT A DISPATCH UNIT
1307
CAUSE A PICKER ROBOT TO PICK PREPACKAGED PHARMACEUTICAL PRODUCTS
1309
RELEASE CONTAINERS FROM THE BOTTLE STORAGE TABLE, MOVE THE PRINTED LITERATURE VIA A PINCH BELT, AND PLACE THE PICKED PREPACKAGED PHARMACEUTICAL PRODUCTS SO THAT ORDERS IN ONE PRESCRIPTION CAN BE PLACED INTO ONE OR MORE BAGS AT A BAGGER STATION
1311

FIG. 13

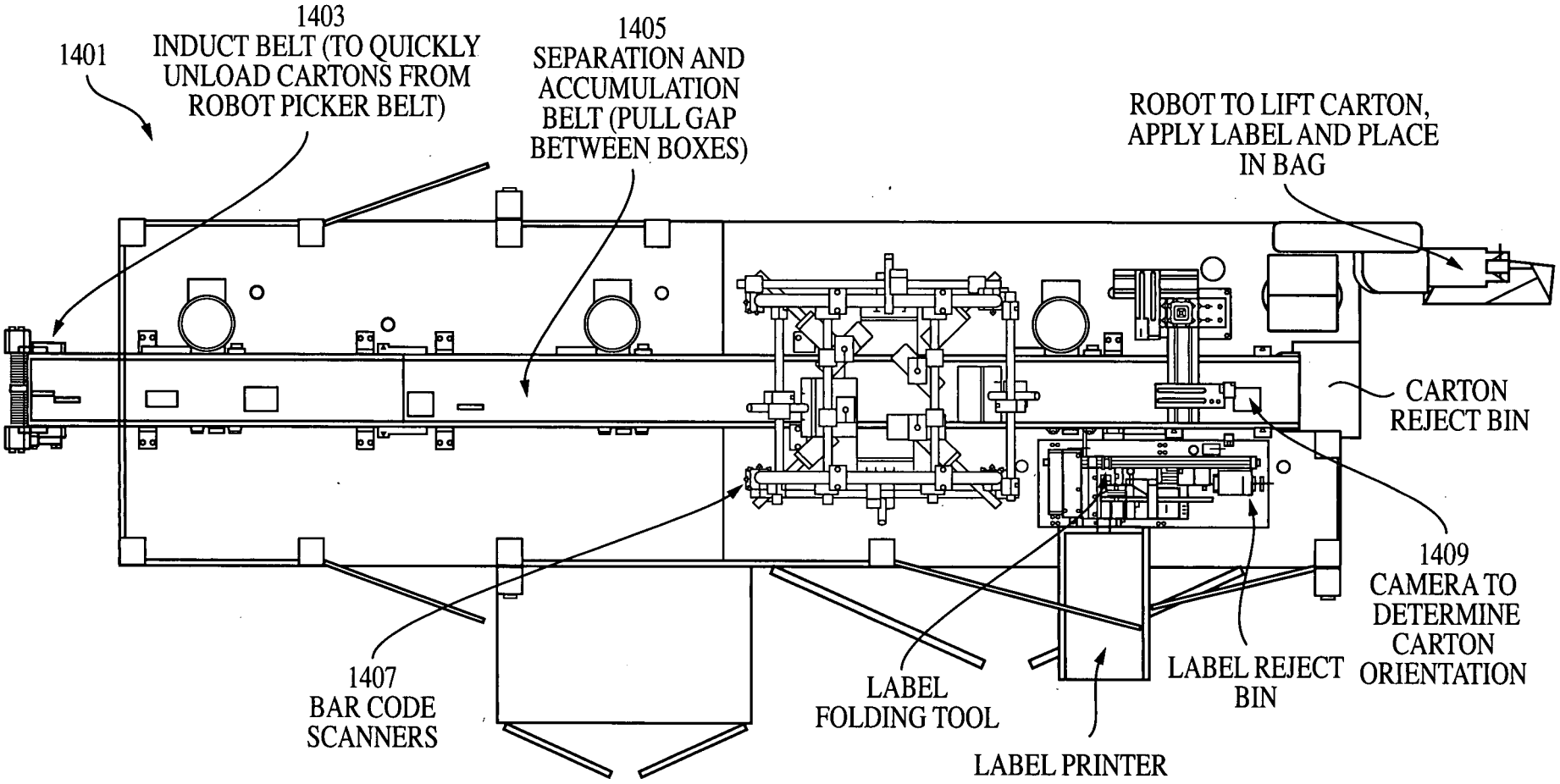

1401
1403
INDUCT BELT (TO QUICKLY UNLOAD CARTONS FROM ROBOT PICKER BELT)
1405
SEPARATION AND ACCUMULATION BELT (PULL GAP BETWEEN BOXES)
ROBOT TO LIFT CARTON, APPLY LABEL AND PLACE IN BAG
CARTON REJECT BIN
1409
CAMERA TO DETERMINE CARTON ORIENTATION
LABEL REJECT BIN
1407
BAR CODE SCANNERS
LABEL FOLDING TOOL
LABEL PRINTER

FIG. 14

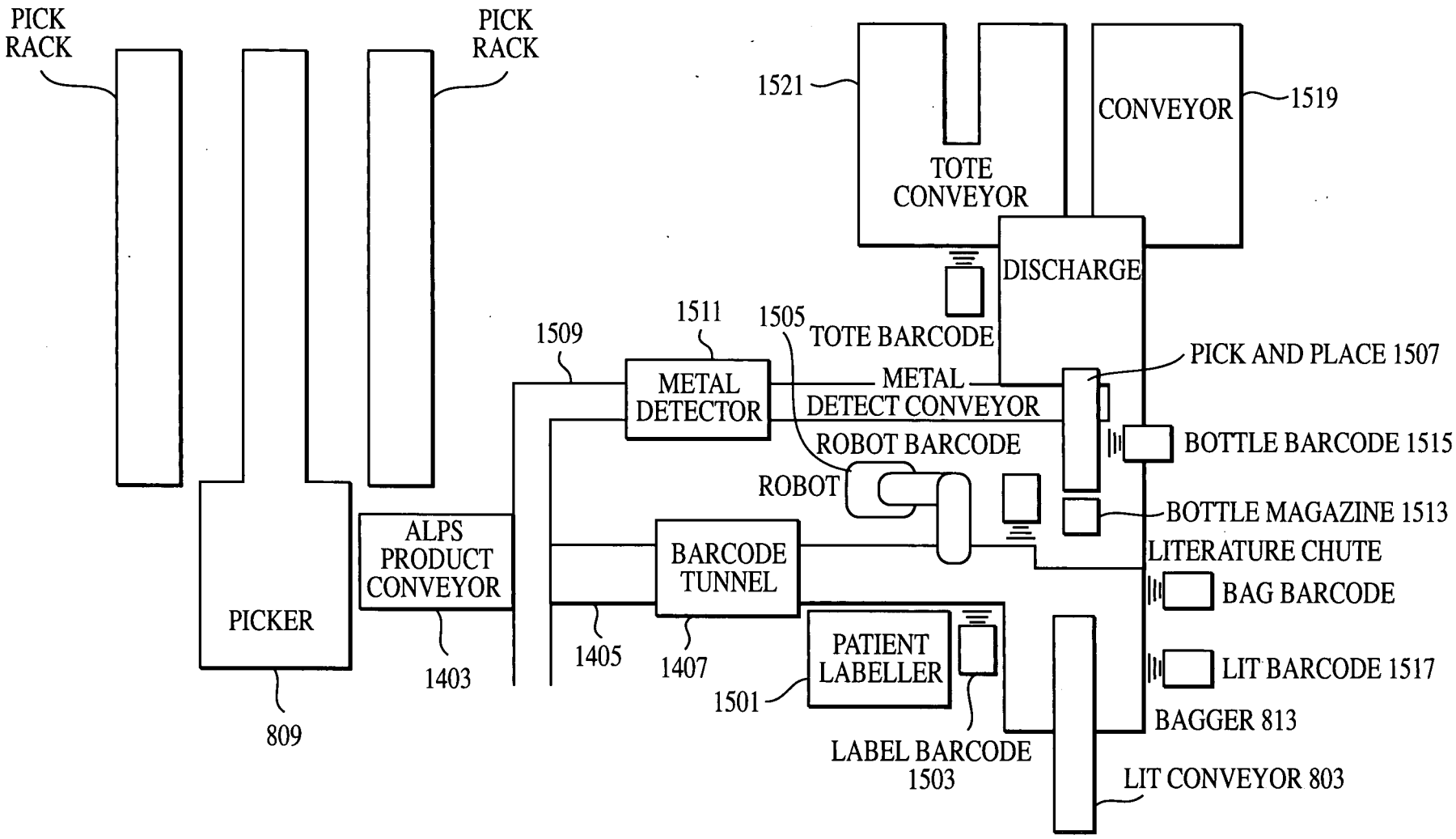

PICK RACK
PICK RACK
1521
TOTE CONVEYOR
CONVEYOR
1519
DISCHARGE
1511
1505
1509
TOTE BARCODE
PICK AND PLACE 1507
METAL DETECTOR
METAL DETECT CONVEYOR
ROBOT BARCODE
BOTTLE BARCODE 1515
ROBOT
BOTTLE MAGAZINE 1513
ALPS PRODUCT CONVEYOR
BARCODE TUNNEL
LITERATURE CHUTE
BAG BARCODE
PICKER
1403
1405
1407
PATIENT LABELLER
LIT BARCODE 1517
1501
BAGGER 813
LABEL BARCODE 1503
LIT CONVEYOR 803
809

FIG. 15A

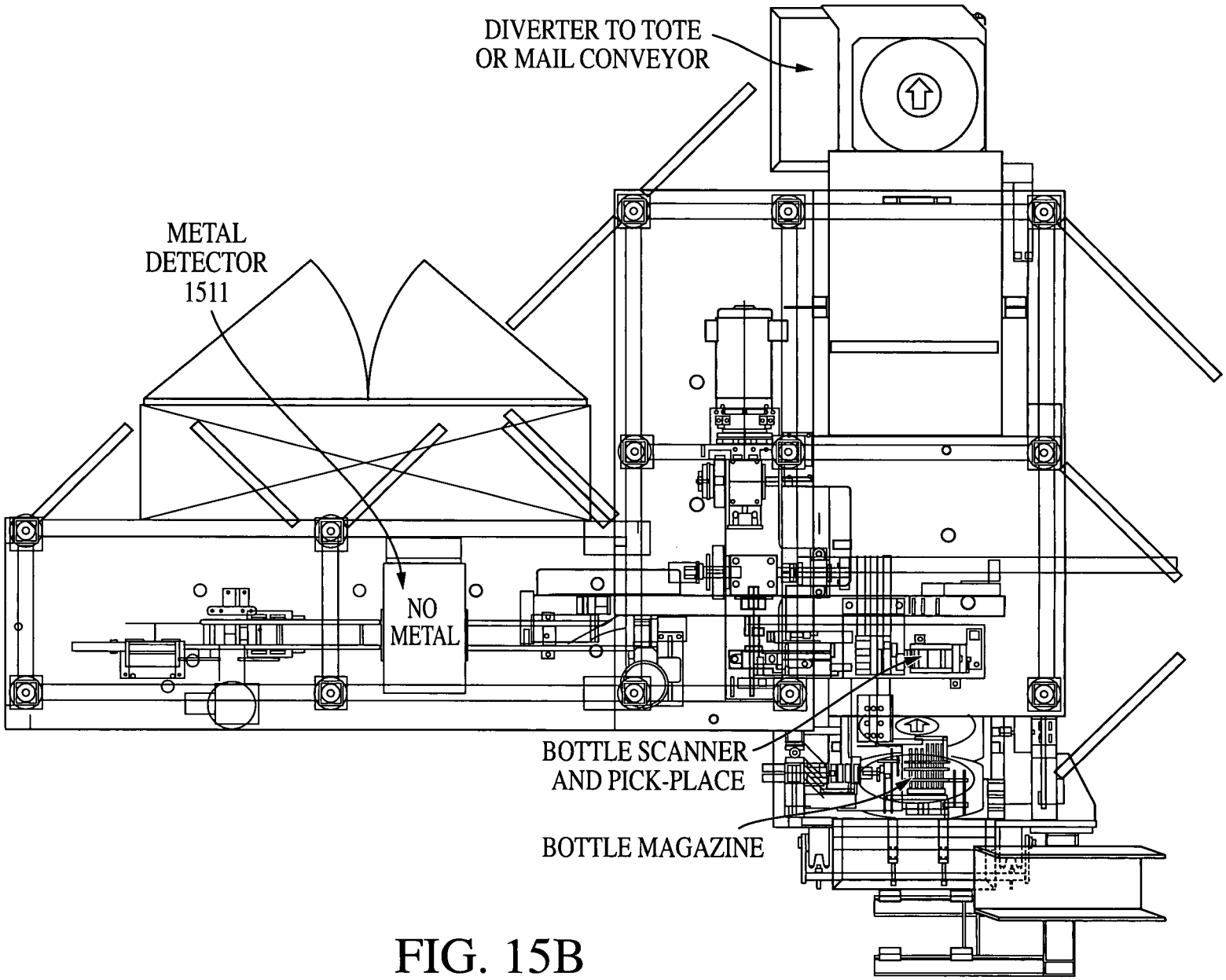

DIVERTER TO TOTE
OR MAIL CONVEYOR
METAL
DETECTOR
1511
NO
METAL
BOTTLE SCANNER
AND PICK-PLACE
BOTTLE MAGAZINE

FIG. 15B

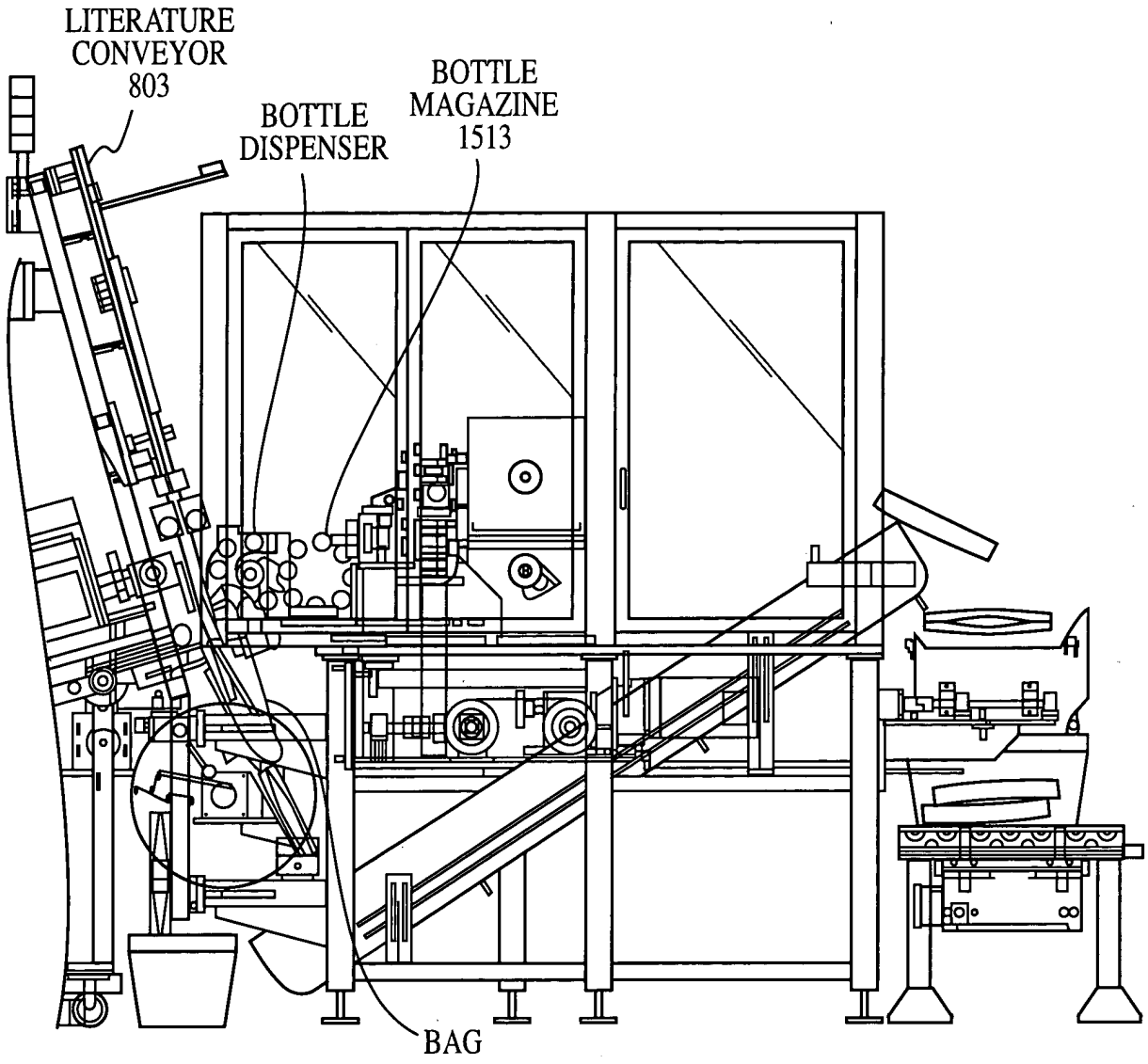

LITERATURE
CONVEYOR
803
BOTTLE
DISPENSER
BOTTLE
MAGAZINE
1513
BAG

FIG. 15C

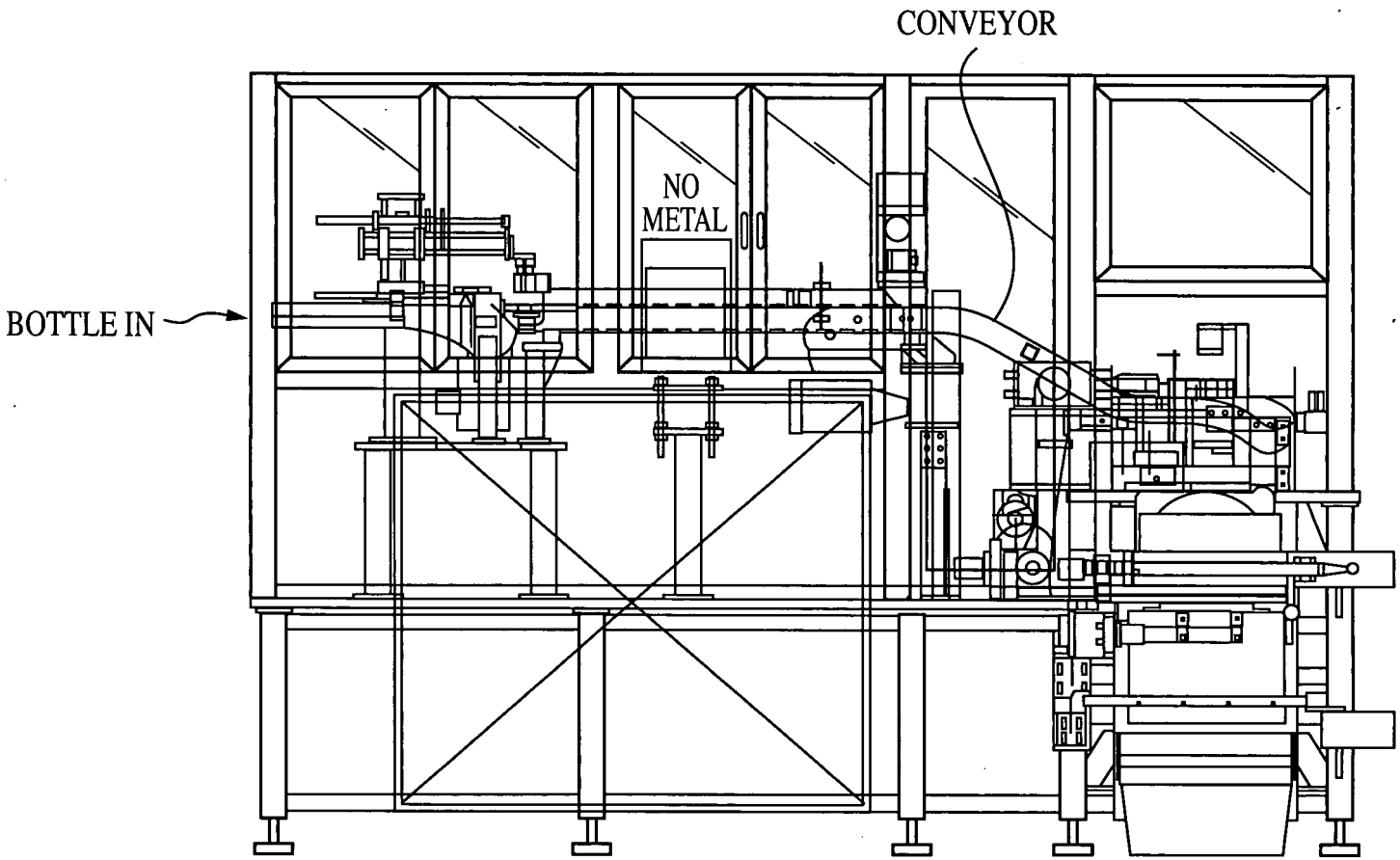


FIG. 15D

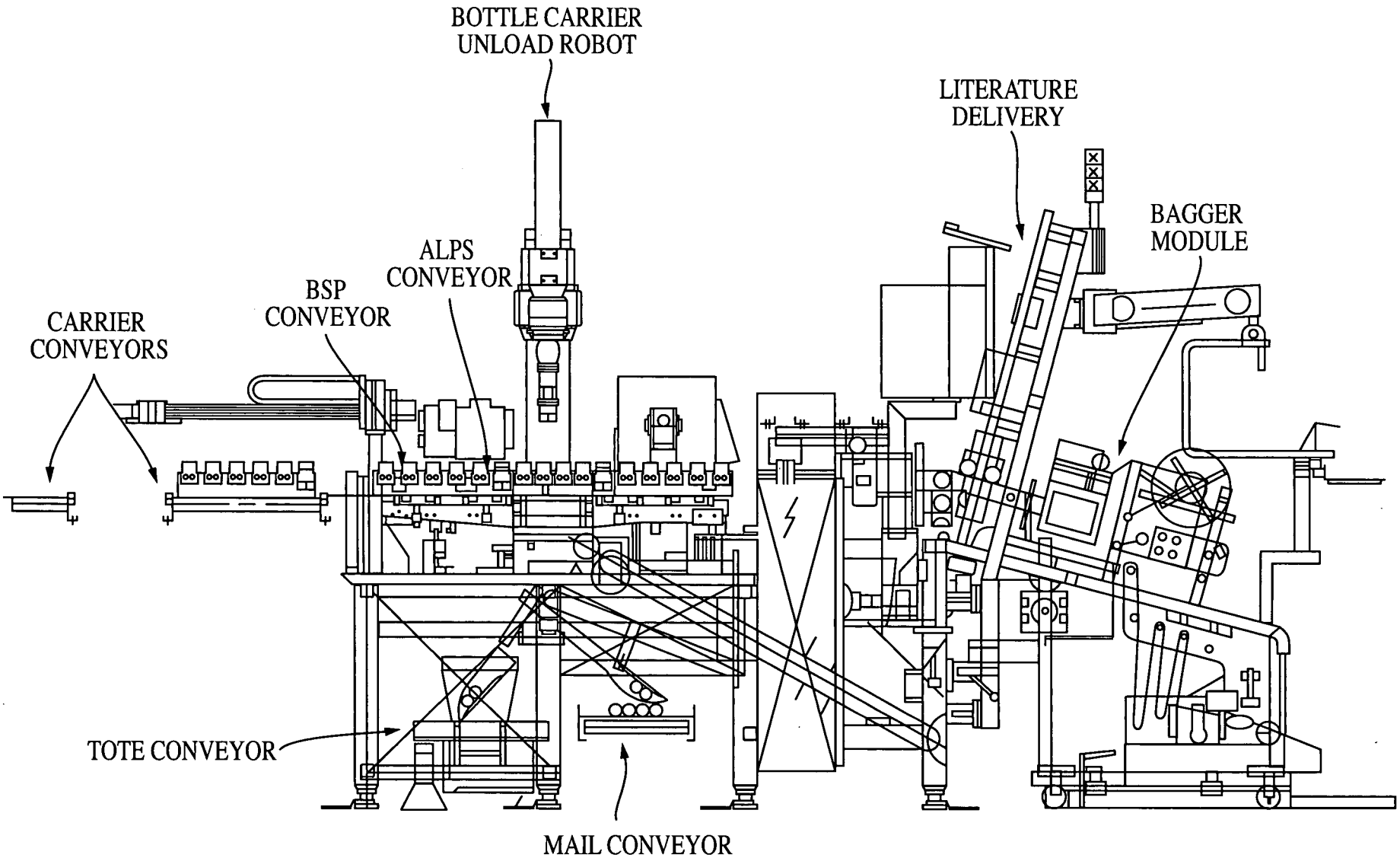

BOTTLE CARRIER
UNLOAD ROBOT
LITERATURE
DELIVERY
BAGGER
MODULE
ALPS
CONVEYOR
BSP
CONVEYOR
CARRIER
CONVEYORS
TOTE CONVEYOR
MAIL CONVEYOR

FIG. 15E

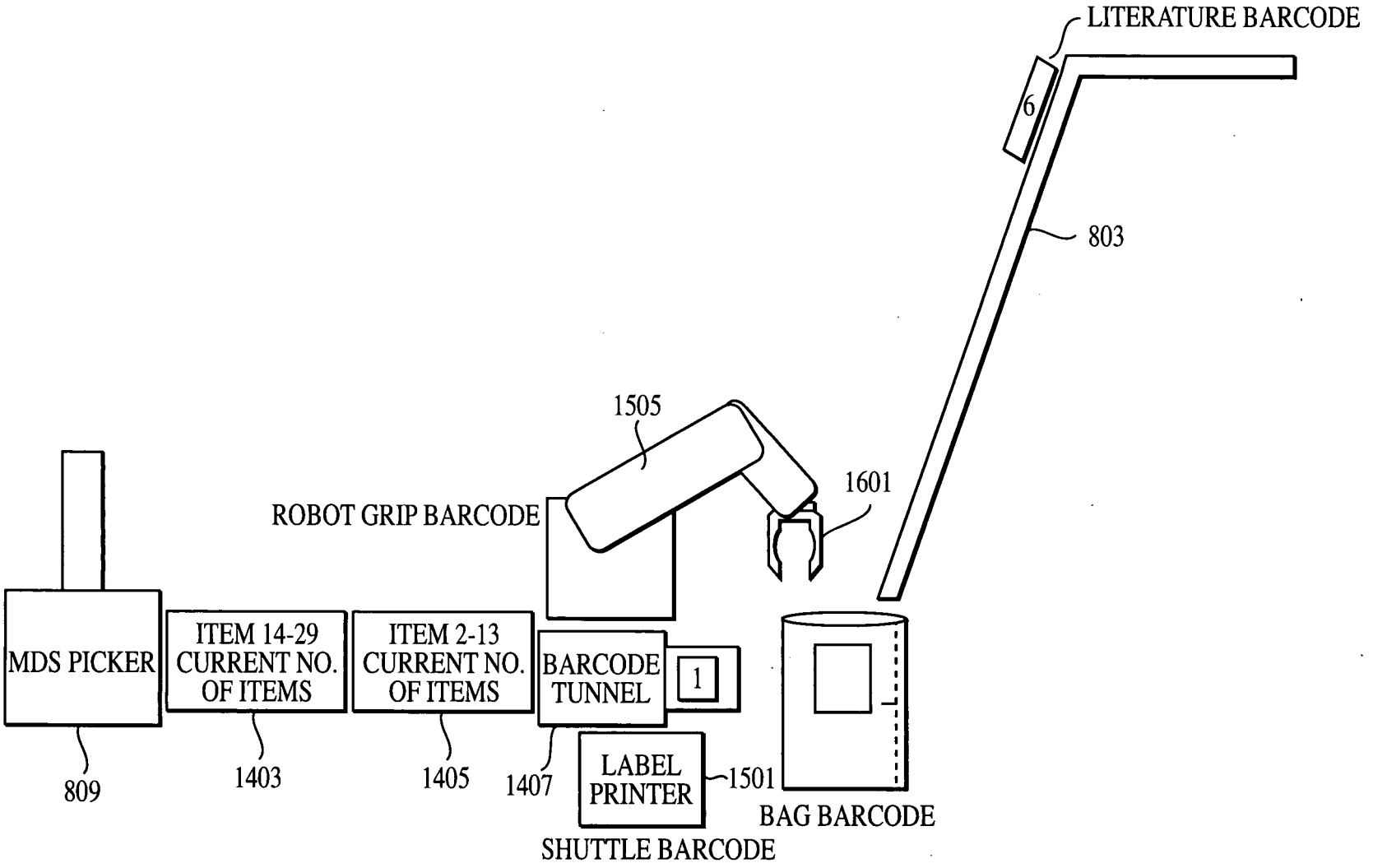

LITERATURE BARCODE
6
803
1505
1601
ROBOT GRIP BARCODE
MDS PICKER
ITEM 14-29
CURRENT NO.
OF ITEMS
ITEM 2-13
CURRENT NO.
OF ITEMS
BARCODE
TUNNEL
1
LABEL
PRINTER
1501
BAG BARCODE
SHUTTLE BARCODE
809
1403
1405
1407

FIG. 16

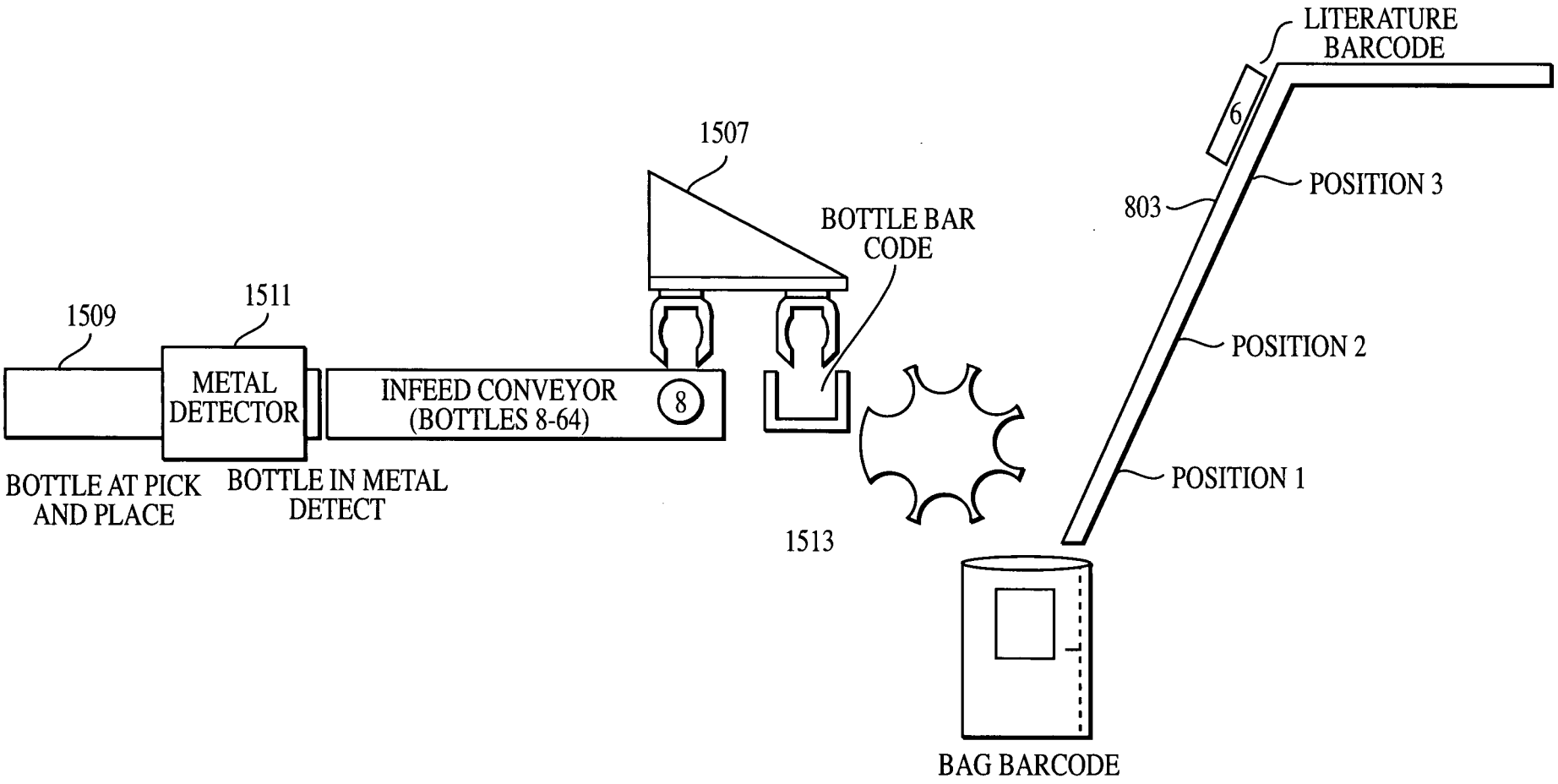

LITERATURE BARCODE
6
1507
POSITION 3
803
BOTTLE BAR CODE
1509
1511
POSITION 2
METAL DETECTOR
INFEED CONVEYOR (BOTTLES 8-64)
8
BOTTLE AT PICK AND PLACE
BOTTLE IN METAL DETECT
POSITION 1
1513
BAG BARCODE

FIG. 17

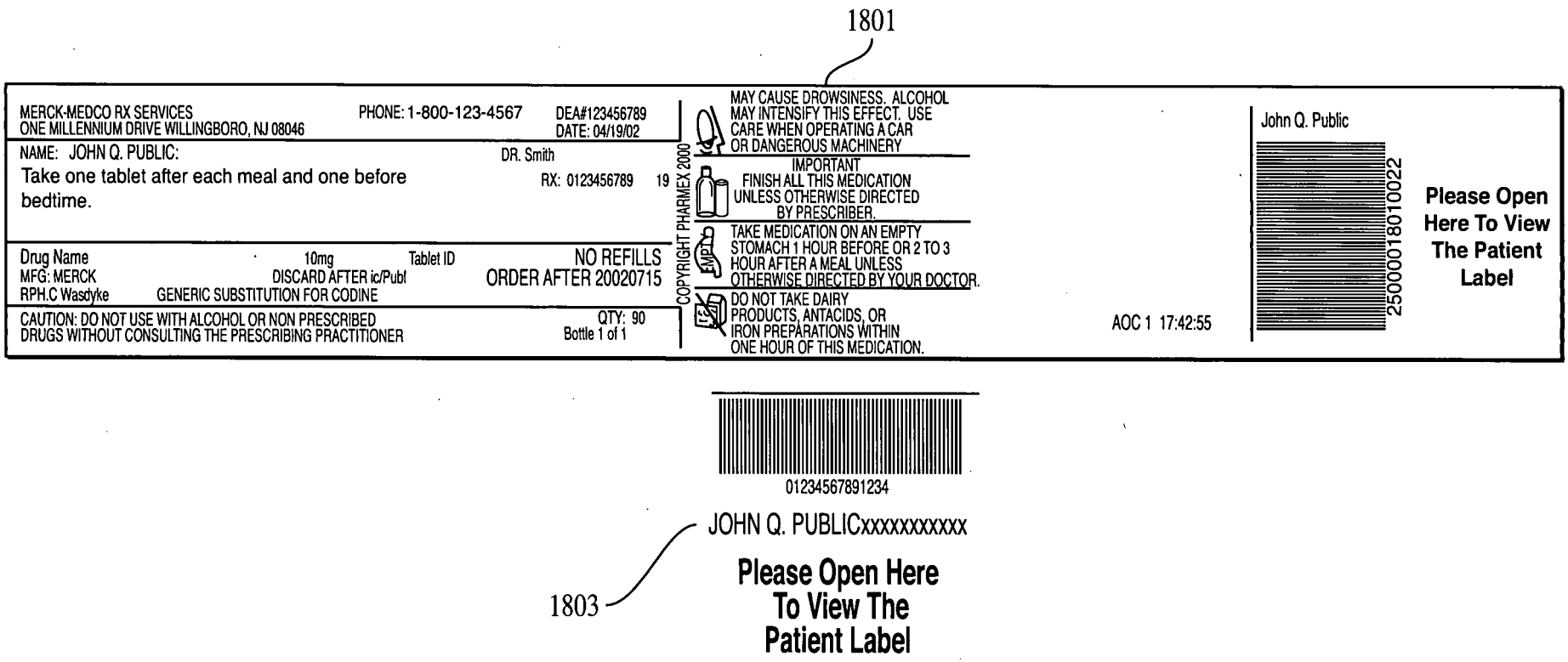

1801
MERCK-MEDCO RX SERVICES
ONE MILLENNIUM DRIVE WILLINGBORO, NJ 08046
PHONE: 1-800-123-4567
DEA#123456789
DATE: 04/19/02
NAME: JOHN Q. PUBLIC:
DR. Smith
Take one tablet after each meal and one before bedtime.
RX: 0123456789 19
Drug Name 10mg Tablet ID
MFG: MERCK DISCARD AFTER ic/Publ
RPH.C Wasdyke GENERIC SUBSTITUTION FOR CODINE
NO REFILLS
ORDER AFTER 20020715
CAUTION: DO NOT USE WITH ALCOHOL OR NON PRESCRIBED DRUGS WITHOUT CONSULTING THE PRESCRIBING PRACTITIONER
QTY: 90
Bottle 1 of 1
COPYRIGHT PHARMEX 2000
MAY CAUSE DROWSINESS. ALCOHOL MAY INTENSIFY THIS EFFECT. USE CARE WHEN OPERATING A CAR OR DANGEROUS MACHINERY
IMPORTANT
FINISH ALL THIS MEDICATION UNLESS OTHERWISE DIRECTED BY PRESCRIBER.
TAKE MEDICATION ON AN EMPTY STOMACH 1 HOUR BEFORE OR 2 TO 3 HOUR AFTER A MEAL UNLESS OTHERWISE DIRECTED BY YOUR DOCTOR.
DO NOT TAKE DAIRY PRODUCTS, ANTACIDS, OR IRON PREPARATIONS WITHIN ONE HOUR OF THIS MEDICATION.
AOC 1 17:42:55
John Q. Public
25000018010022
Please Open Here To View The Patient Label
01234567891234
JOHN Q. PUBLICxxxxxxxxxx
1803
Please Open Here To View The Patient Label

FIG. 18

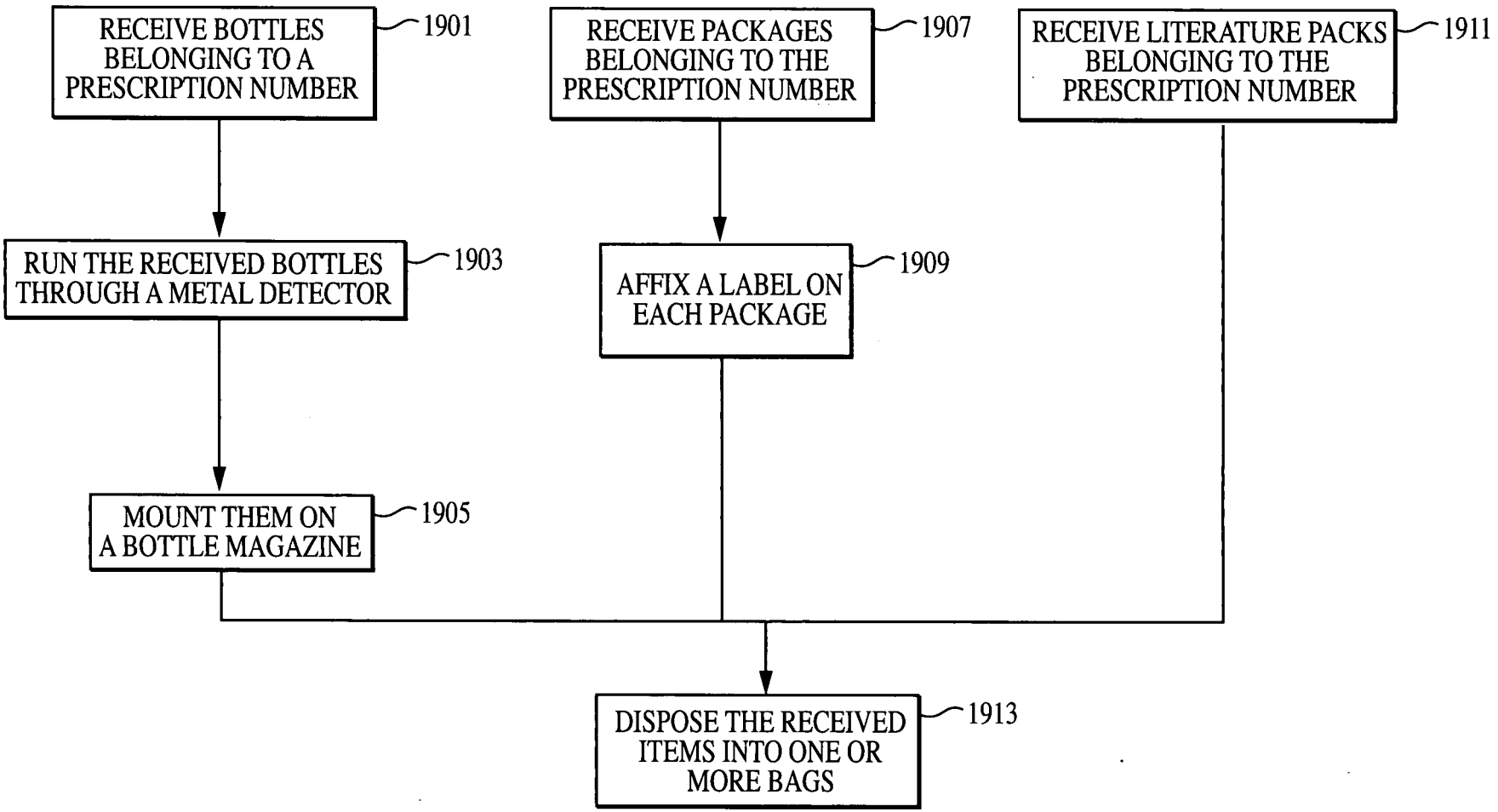

RECEIVE BOTTLES BELONGING TO A PRESCRIPTION NUMBER
1901
RECEIVE PACKAGES BELONGING TO THE PRESCRIPTION NUMBER
1907
RECEIVE LITERATURE PACKS BELONGING TO THE PRESCRIPTION NUMBER
1911
RUN THE RECEIVED BOTTLES THROUGH A METAL DETECTOR
1903
AFFIX A LABEL ON EACH PACKAGE
1909
MOUNT THEM ON A BOTTLE MAGAZINE
1905
DISPOSE THE RECEIVED ITEMS INTO ONE OR MORE BAGS
1913

FIG. 19

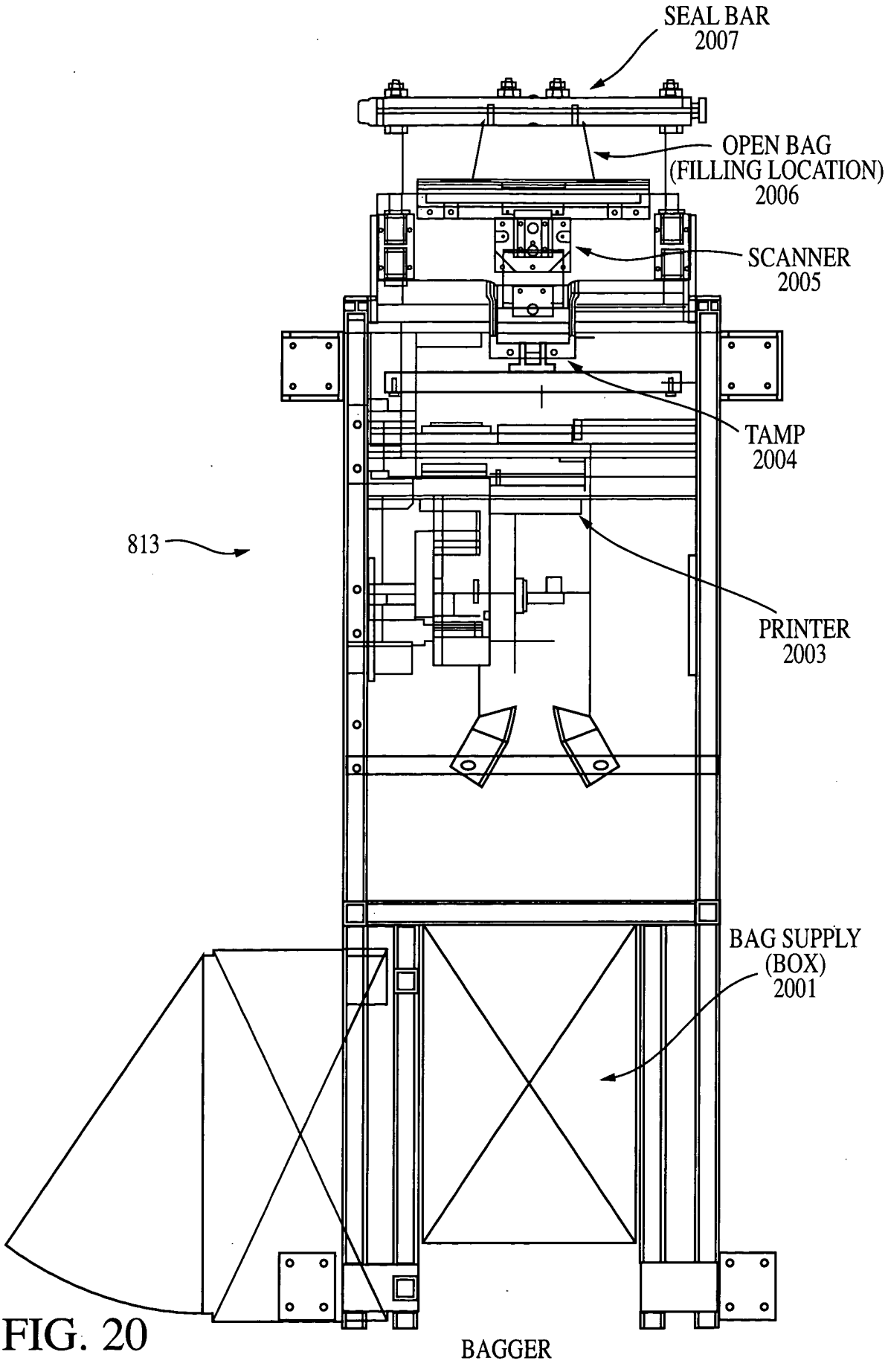

SEAL BAR
2007
OPEN BAG
(FILLING LOCATION)
2006
SCANNER
2005
TAMP
2004
813
PRINTER
2003
BAG SUPPLY
(BOX)
2001
BAGGER

FIG. 20

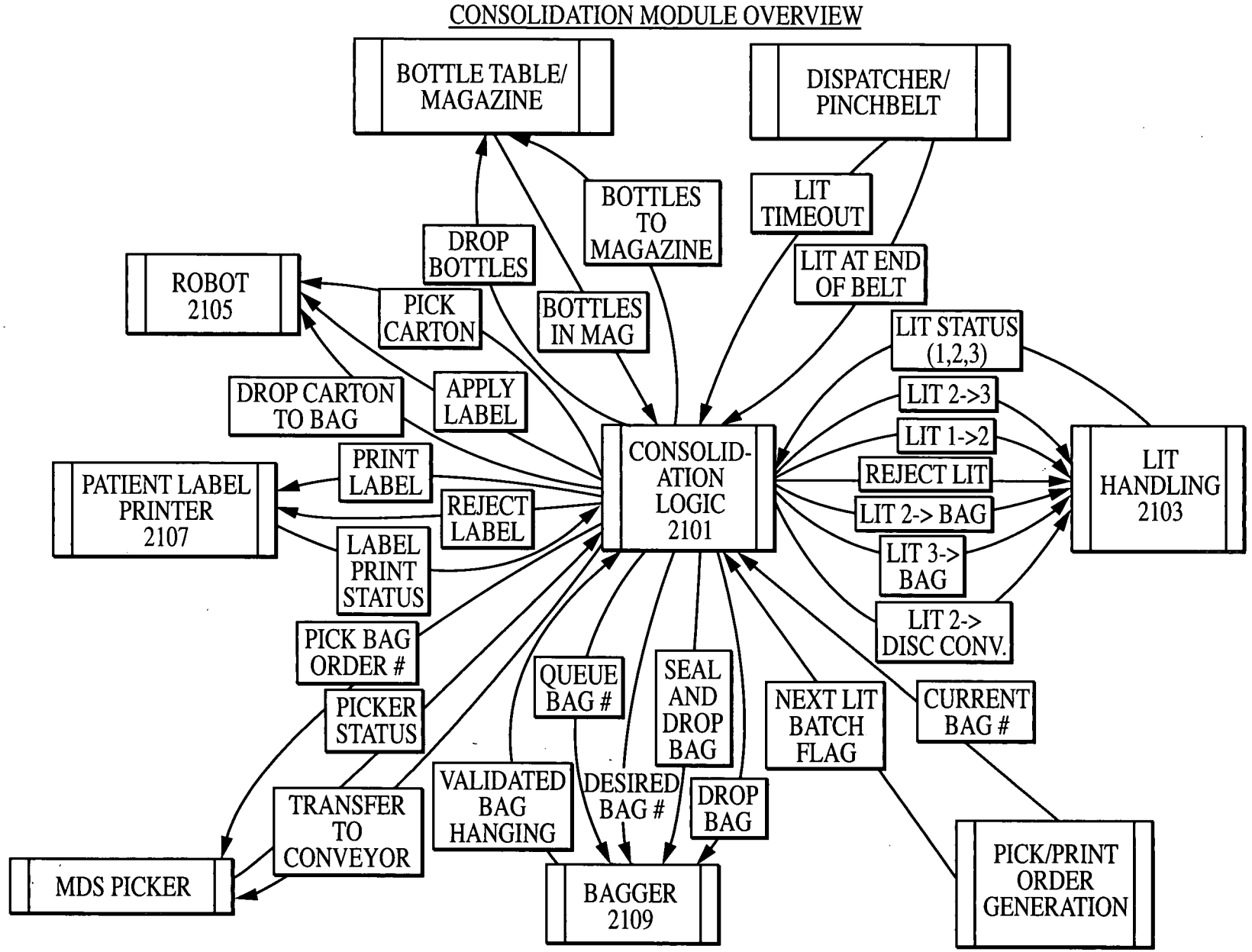

CONSOLIDATION MODULE OVERVIEW
BOTTLE TABLE/ MAGAZINE
DISPATCHER/ PINCHBELT
BOTTLES TO MAGAZINE
LIT TIMEOUT
DROP BOTTLES
LIT AT END OF BELT
ROBOT 2105
PICK CARTON
BOTTLES IN MAG
LIT STATUS (1,2,3)
DROP CARTON TO BAG
APPLY LABEL
LIT 2->3
LIT 1->2
PRINT LABEL
CONSOLID-ATION LOGIC 2101
LIT HANDLING 2103
PATIENT LABEL PRINTER 2107
REJECT LABEL
REJECT LIT
LIT 2-> BAG
LABEL PRINT STATUS
LIT 3-> BAG
LIT 2-> DISC CONV.
PICK BAG ORDER #
QUEUE BAG #
SEAL AND DROP BAG
NEXT LIT BATCH FLAG
CURRENT BAG #
PICKER STATUS
VALIDATED BAG HANGING
DESIRED BAG #
DROP BAG
TRANSFER TO CONVEYOR
MDS PICKER
BAGGER 2109
PICK/PRINT ORDER GENERATION

FIG. 21

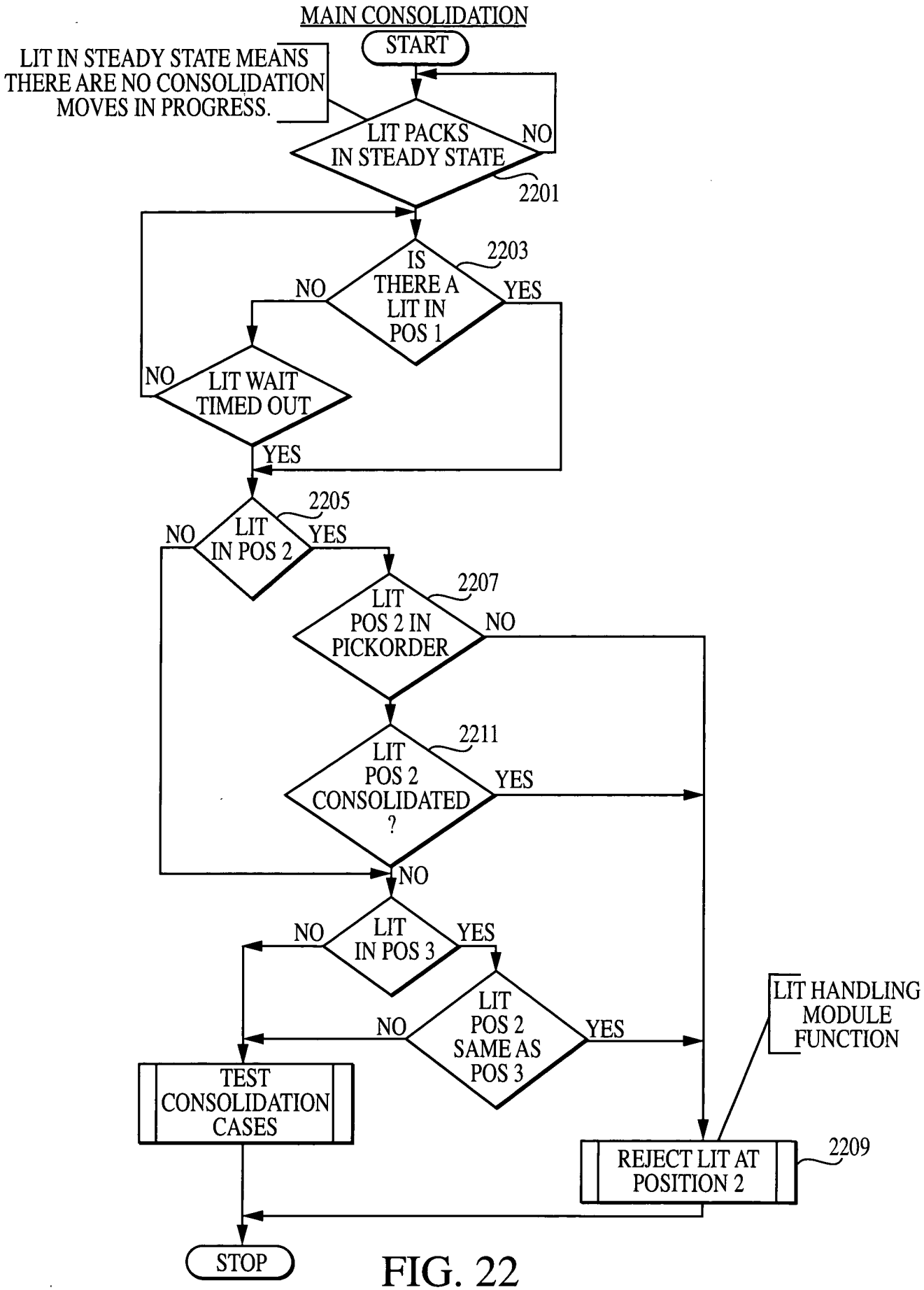

MAIN CONSOLIDATION
START
LIT IN STEADY STATE MEANS THERE ARE NO CONSOLIDATION MOVES IN PROGRESS.
LIT PACKS IN STEADY STATE
NO
2201
IS THERE A LIT IN POS 1
2203
NO
YES
NO
LIT WAIT TIMED OUT
YES
LIT IN POS 2
2205
NO
YES
LIT POS 2 IN PICKORDER
2207
NO
LIT POS 2 CONSOLIDATED ?
2211
YES
NO
LIT IN POS 3
NO
YES
LIT POS 2 SAME AS POS 3
NO
YES
LIT HANDLING MODULE FUNCTION
TEST CONSOLIDATION CASES
REJECT LIT AT POSITION 2
2209
STOP

FIG. 22

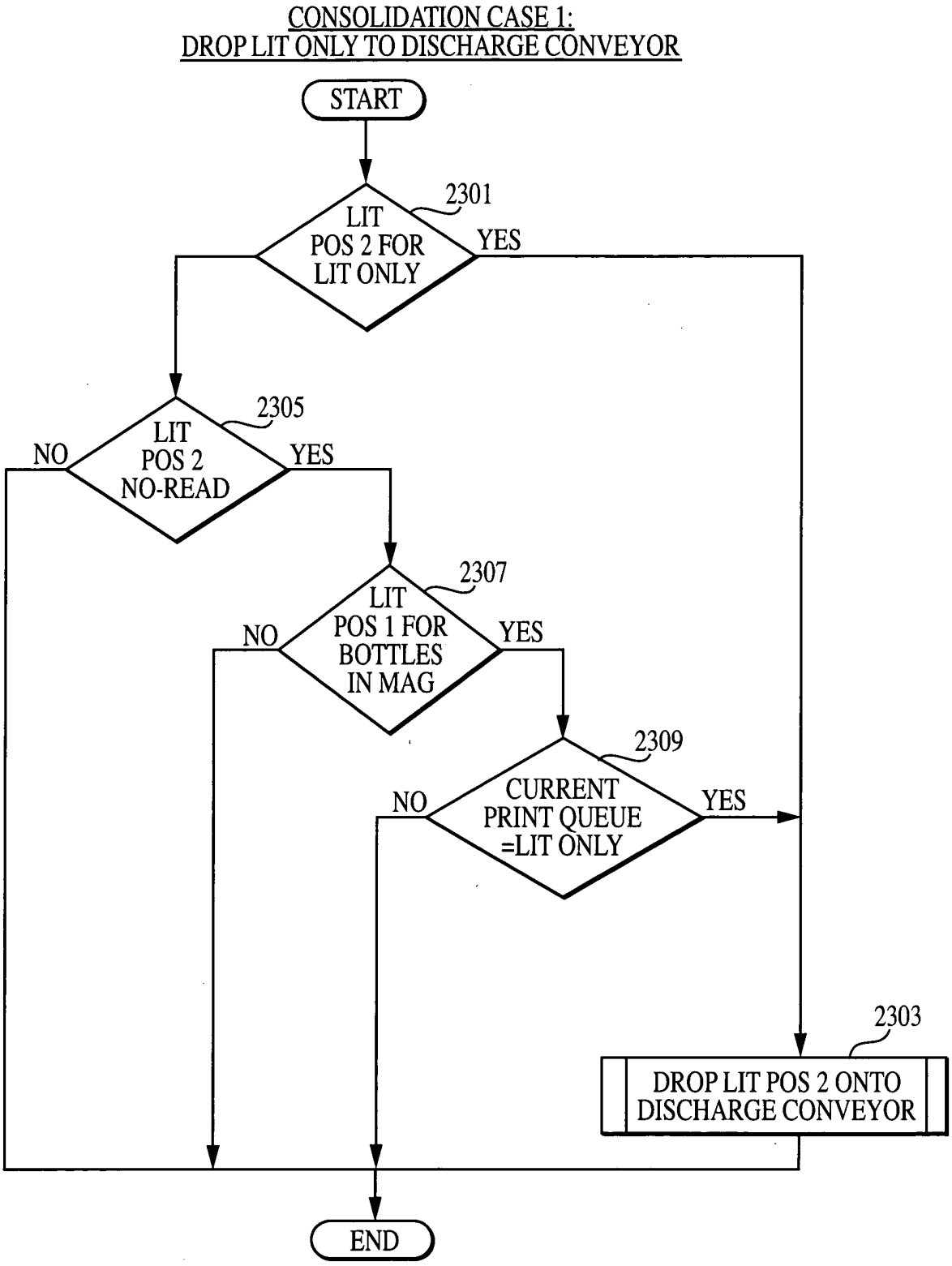

CONSOLIDATION CASE 1:
DROP LIT ONLY TO DISCHARGE CONVEYOR
START
2301
LIT
POS 2 FOR
LIT ONLY
YES
2305
LIT
POS 2
NO-READ
NO
YES
2307
LIT
POS 1 FOR
BOTTLES
IN MAG
NO
YES
2309
CURRENT
PRINT QUEUE
=LIT ONLY
NO
YES
2303
DROP LIT POS 2 ONTO
DISCHARGE CONVEYOR
END

FIG. 23

CONSOLIDATION CASE 2:
DROP LIT POSITION 2 INTO BAG

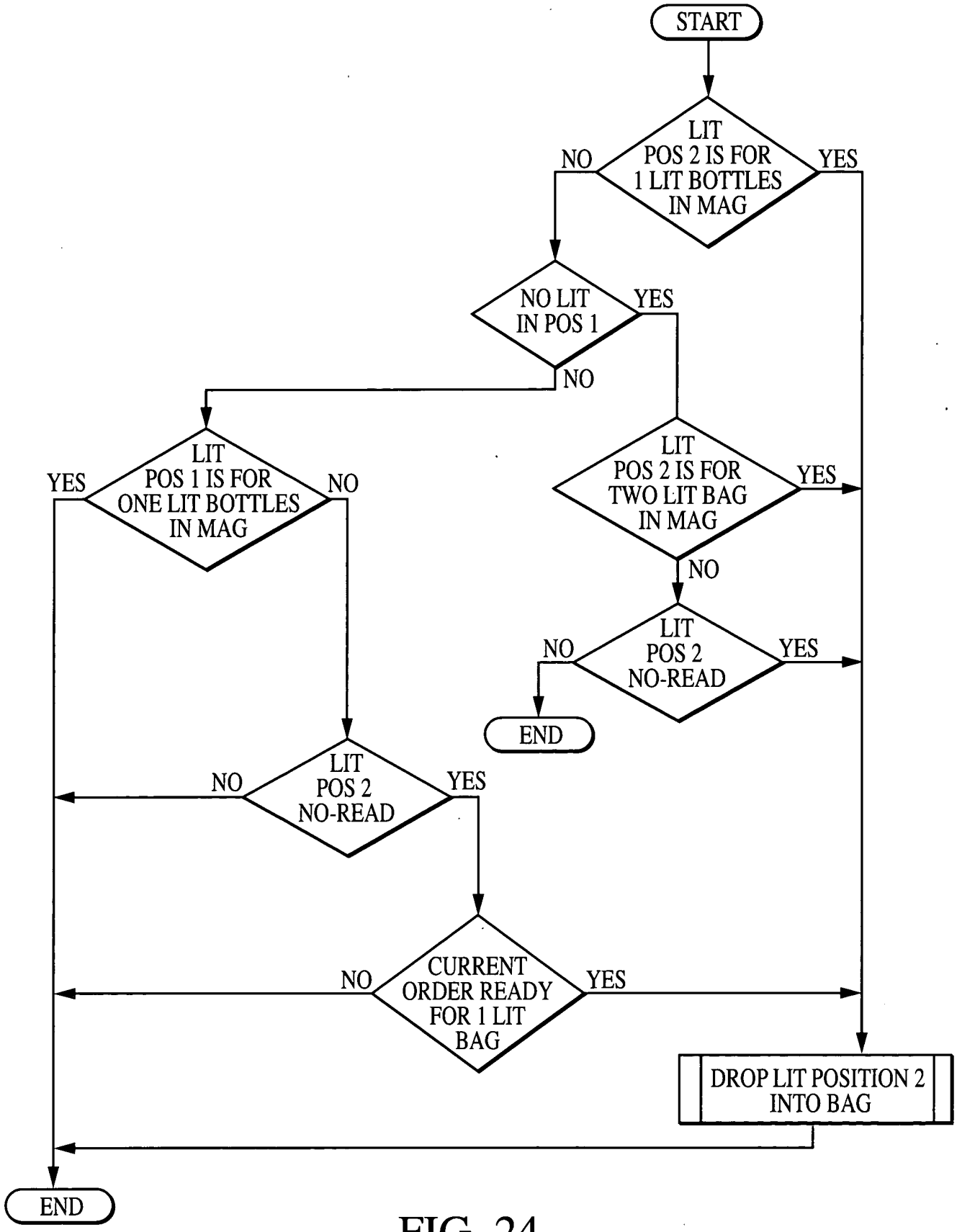


FIG. 24

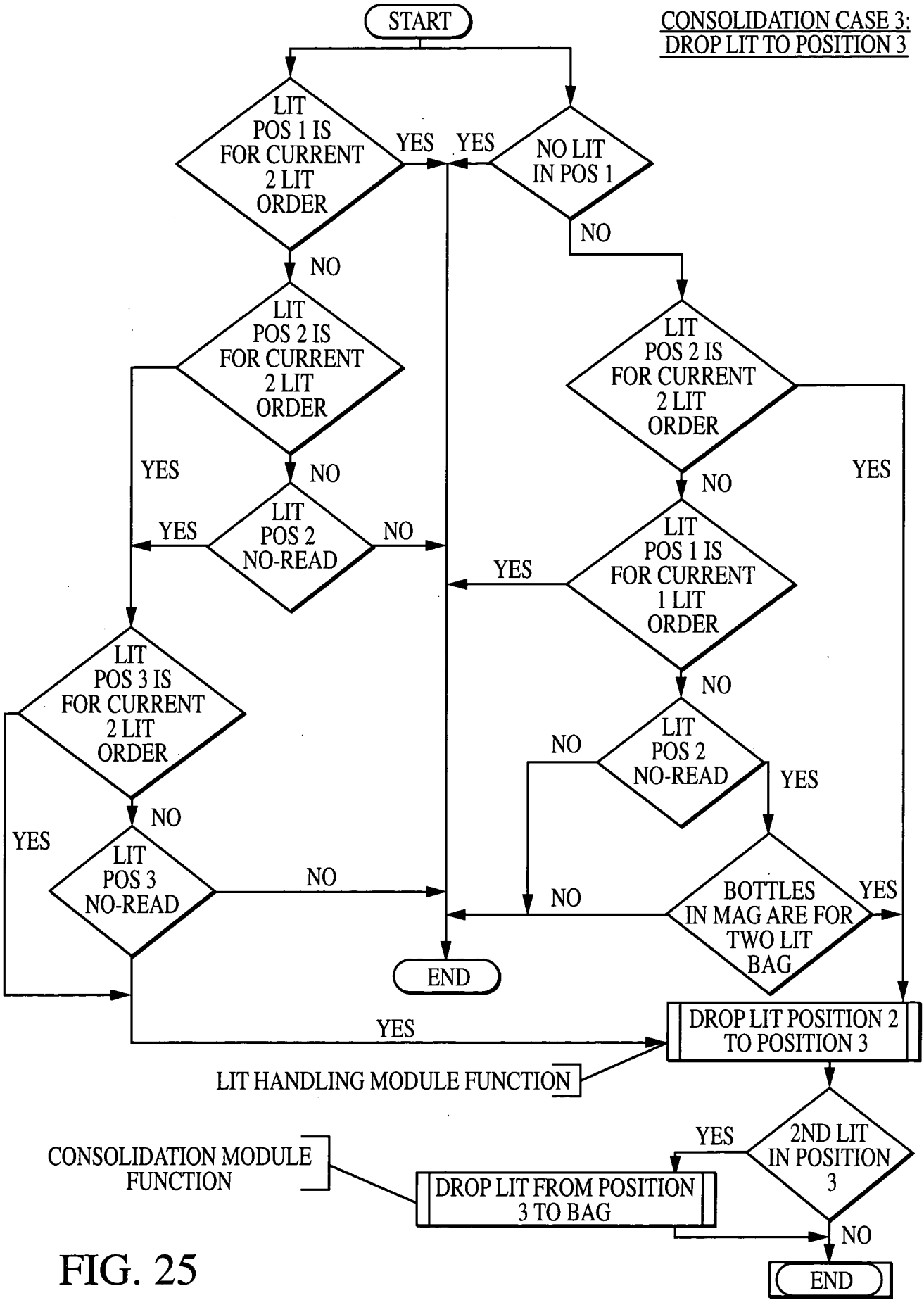

CONSOLIDATION CASE 3:
DROP LIT TO POSITION 3
START
LIT POS 1 IS FOR CURRENT 2 LIT ORDER
YES
YES
NO LIT IN POS 1
NO
NO
LIT POS 2 IS FOR CURRENT 2 LIT ORDER
LIT POS 2 IS FOR CURRENT 2 LIT ORDER
YES
NO
YES
NO
LIT POS 2 NO-READ
YES
NO
YES
LIT POS 1 IS FOR CURRENT 1 LIT ORDER
NO
LIT POS 3 IS FOR CURRENT 2 LIT ORDER
NO
LIT POS 2 NO-READ
NO
YES
YES
NO
LIT POS 3 NO-READ
NO
NO
BOTTLES IN MAG ARE FOR TWO LIT BAG
YES
END
YES
DROP LIT POSITION 2 TO POSITION 3
LIT HANDLING MODULE FUNCTION
CONSOLIDATION MODULE FUNCTION
YES
2ND LIT IN POSITION 3
DROP LIT FROM POSITION 3 TO BAG
NO
END

FIG. 25

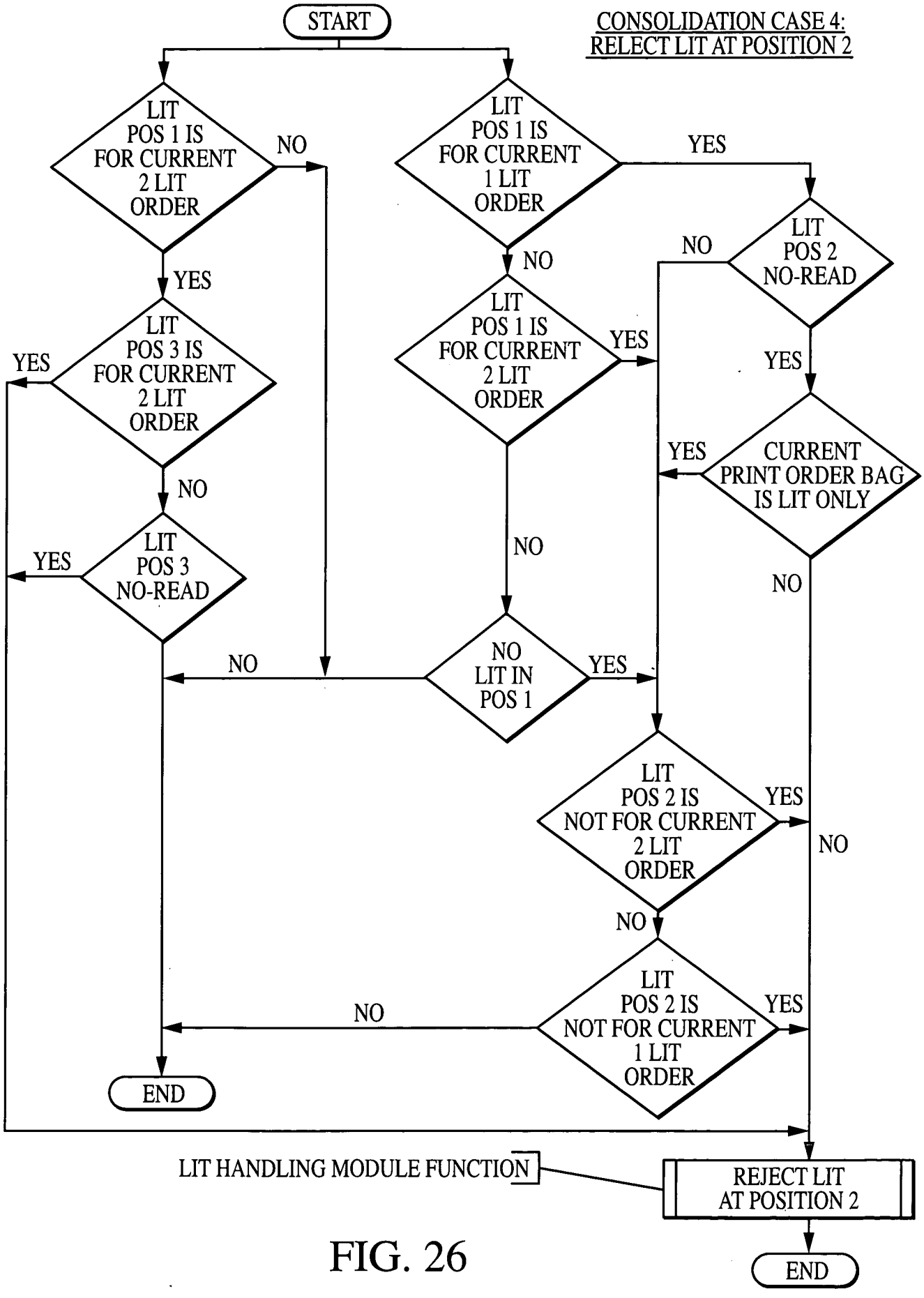

START
CONSOLIDATION CASE 4:
RELECT LIT AT POSITION 2
LIT POS 1 IS FOR CURRENT 2 LIT ORDER
NO
YES
LIT POS 3 IS FOR CURRENT 2 LIT ORDER
YES
NO
LIT POS 3 NO-READ
YES
NO
LIT POS 1 IS FOR CURRENT 1 LIT ORDER
YES
NO
LIT POS 1 IS FOR CURRENT 2 LIT ORDER
YES
NO
LIT POS 2 NO-READ
NO
YES
CURRENT PRINT ORDER BAG IS LIT ONLY
YES
NO
NO LIT IN POS 1
NO
YES
LIT POS 2 IS NOT FOR CURRENT 2 LIT ORDER
YES
NO
NO
LIT POS 2 IS NOT FOR CURRENT 1 LIT ORDER
NO
YES
END
LIT HANDLING MODULE FUNCTION
REJECT LIT AT POSITION 2
END

FIG. 26

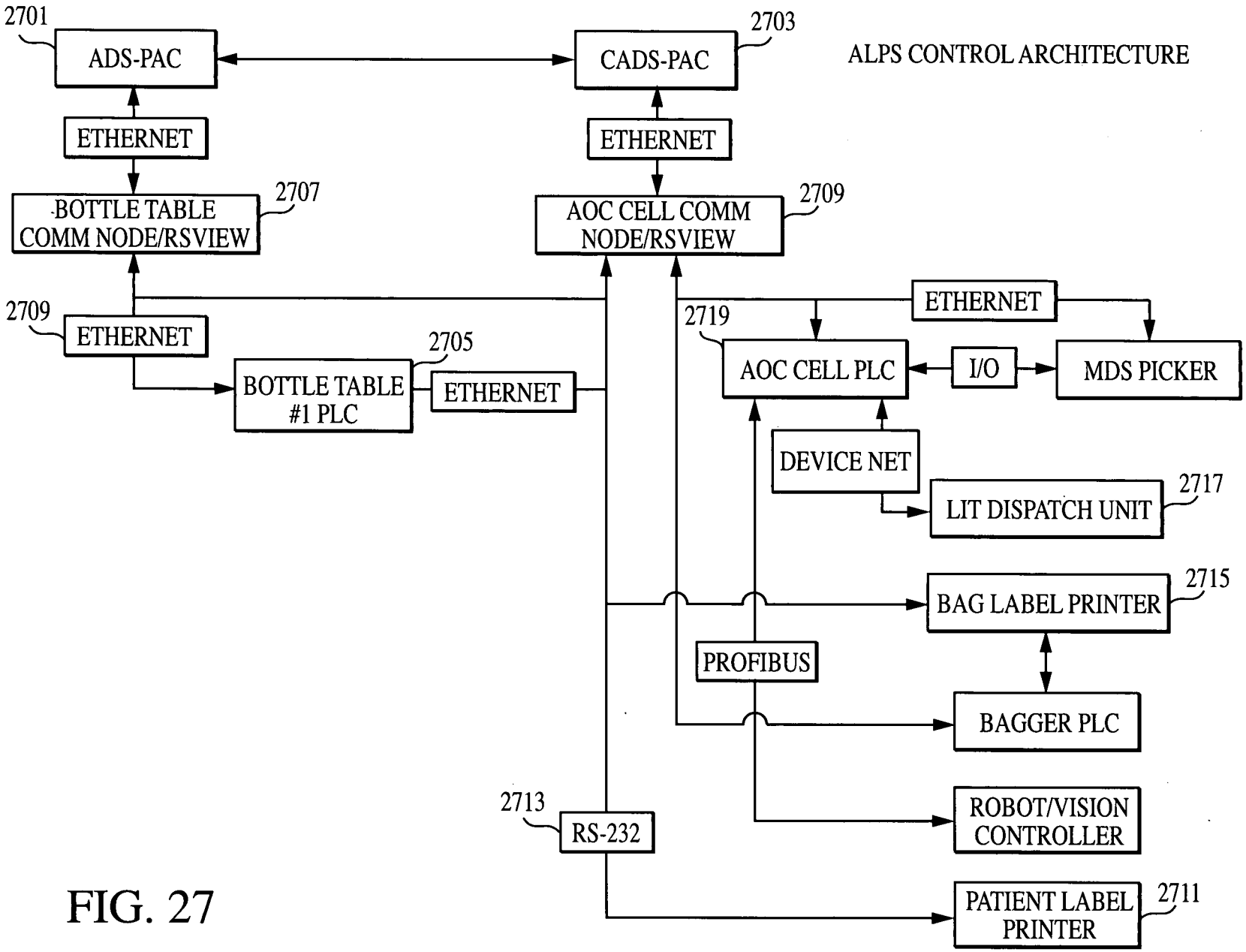

2701
ADS-PAC
2703
CADS-PAC
ALPS CONTROL ARCHITECTURE
ETHERNET
ETHERNET
2707
BOTTLE TABLE COMM NODE/RSVIEW
2709
AOC CELL COMM NODE/RSVIEW
2709
ETHERNET
ETHERNET
2719
2705
BOTTLE TABLE #1 PLC
ETHERNET
AOC CELL PLC
I/O
MDS PICKER
DEVICE NET
2717
LIT DISPATCH UNIT
2715
BAG LABEL PRINTER
PROFIBUS
BAGGER PLC
2713
RS-232
ROBOT/VISION CONTROLLER
PATIENT LABEL PRINTER
2711

FIG. 27

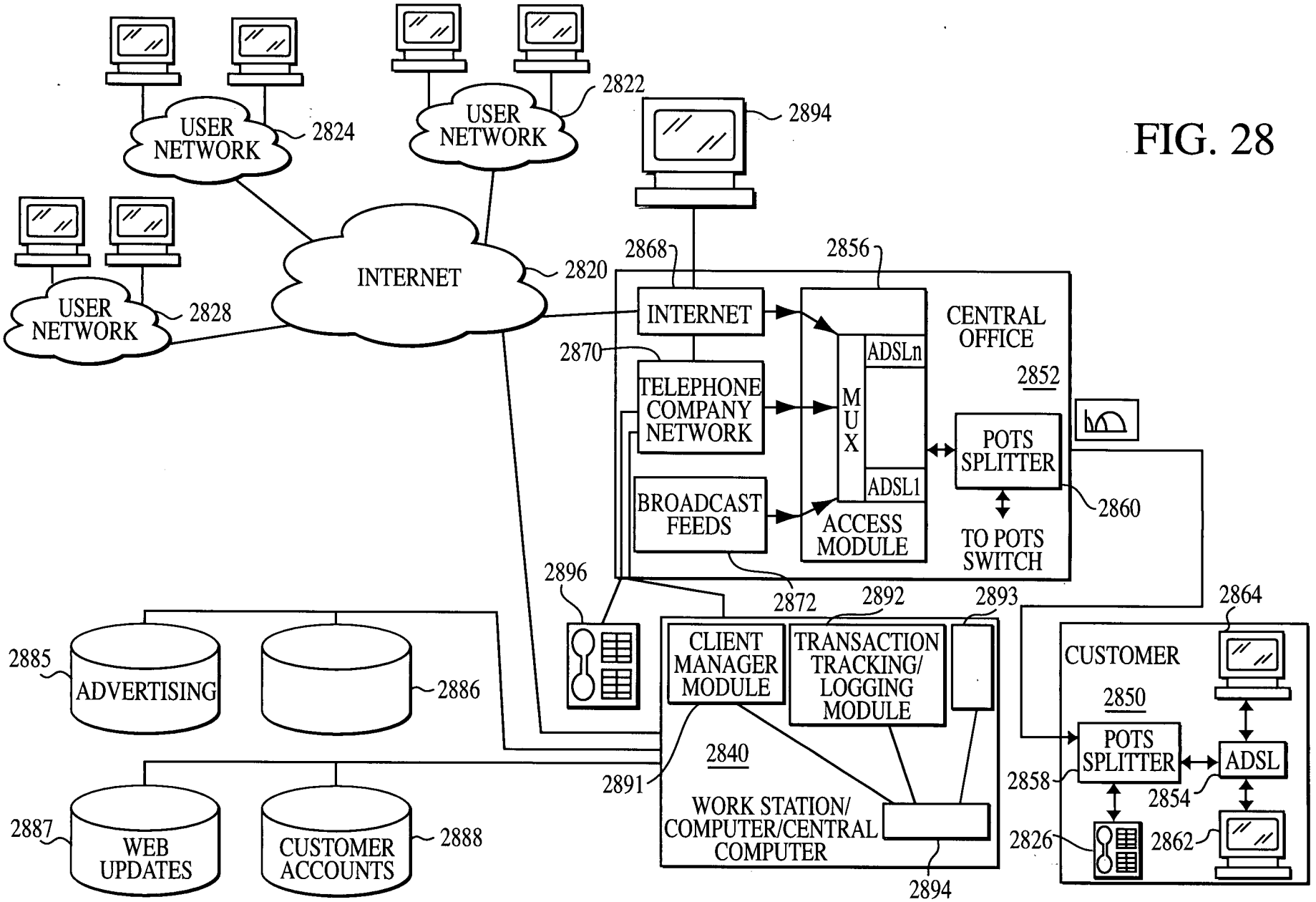

USER NETWORK
2824
USER NETWORK
2822
2894
USER NETWORK
2828
INTERNET
2820
2868
2856
INTERNET
CENTRAL OFFICE
2852
2870
TELEPHONE COMPANY NETWORK
BROADCAST FEEDS
MUX
ADSLn
ADSL1
ACCESS MODULE
POTS SPLITTER
TO POTS SWITCH
2860
2896
2872
2892
2893
2864
CLIENT MANAGER MODULE
TRANSACTION TRACKING/ LOGGING MODULE
CUSTOMER
2850
2885
ADVERTISING
2886
2840
2891
POTS SPLITTER
ADSL
2858
2854
2887
WEB UPDATES
CUSTOMER ACCOUNTS
2888
WORK STATION/ COMPUTER/CENTRAL COMPUTER
2826
2862
2894

FIG. 28

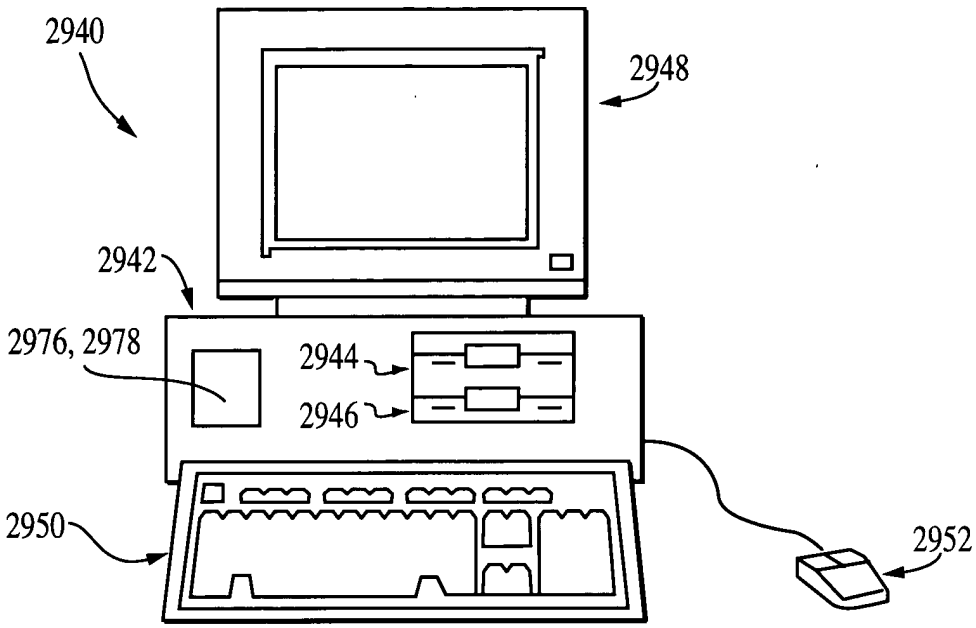


FIG. 29

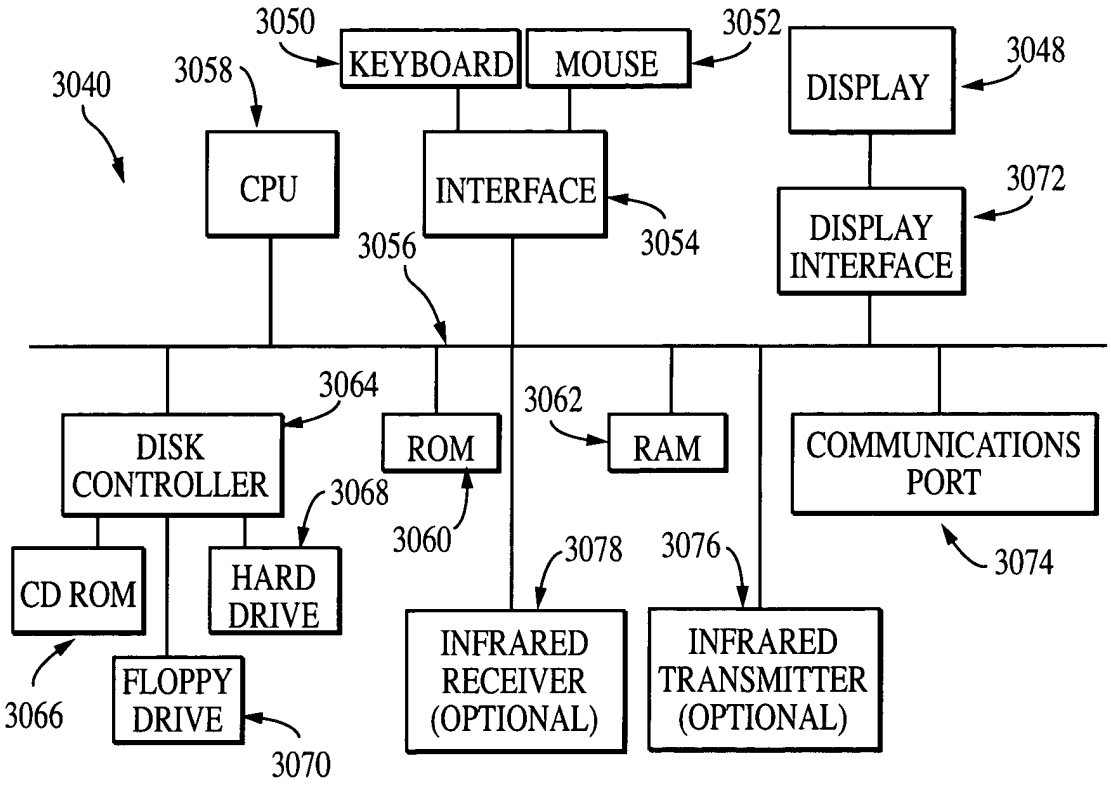

3040
3050
KEYBOARD
MOUSE
3052
3058
CPU
INTERFACE
3054
3056
DISPLAY
3048
DISPLAY INTERFACE
3072
3064
DISK CONTROLLER
ROM
3062
RAM
COMMUNICATIONS PORT
3074
3068
3060
CD ROM
HARD DRIVE
3078
3076
INFRARED RECEIVER (OPTIONAL)
INFRARED TRANSMITTER (OPTIONAL)
3066
FLOPPY DRIVE
3070

FIG. 30

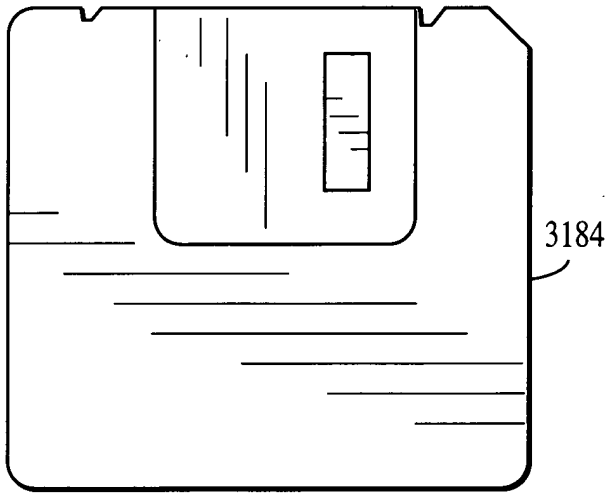


FIG. 31